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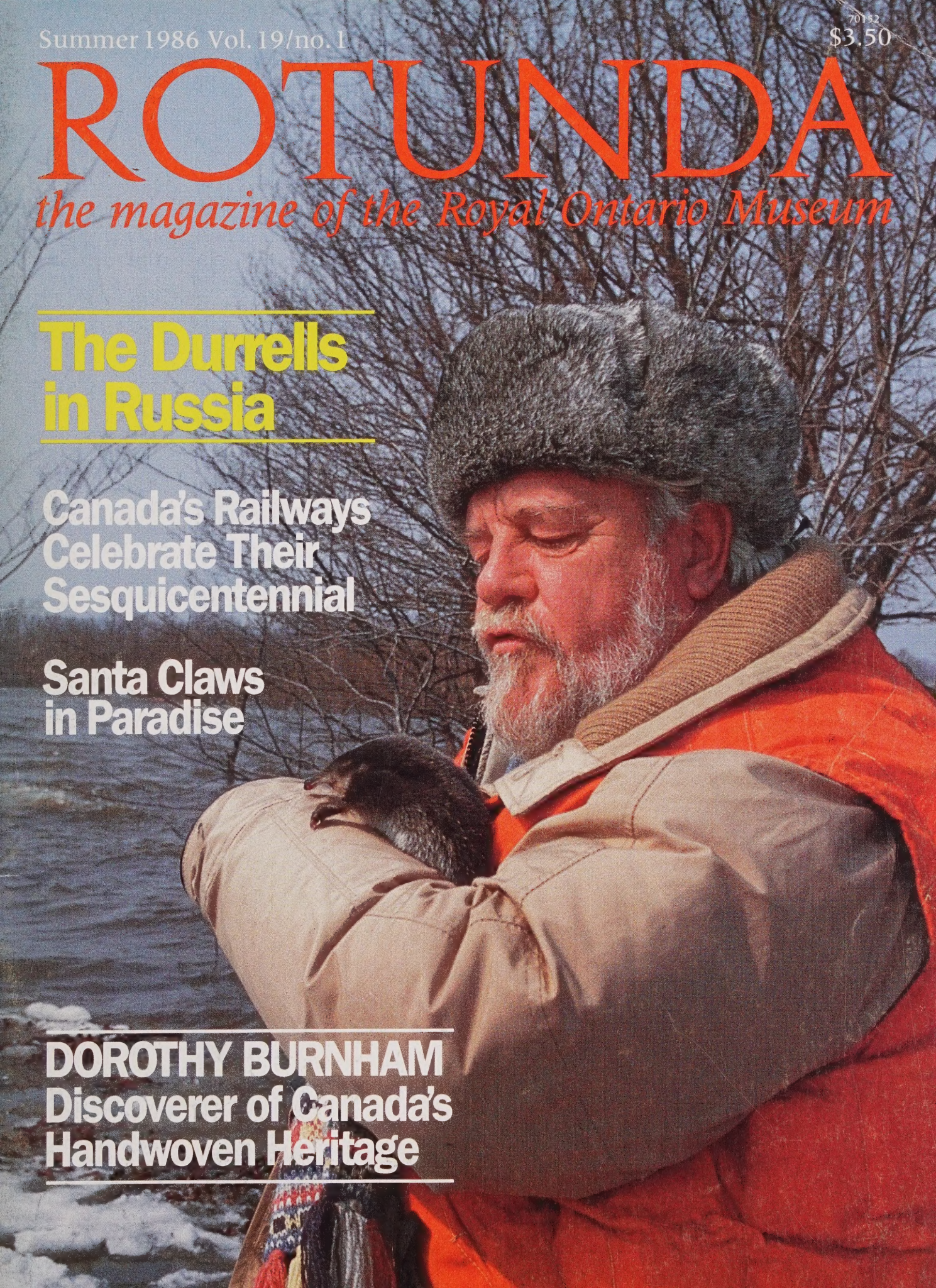
ROTUNDA

the magazine of the Royal Ontario Museum



The Durrells in Russia

Canada's Railways Celebrate Their Sesquicentennial

Santa Claws in Paradise

DOROTHY BURNHAM Discoverer of Canada's Handwoven Heritage

CHRISTOPHER PRATT

A RETROSPECTIVE ORGANIZED BY THE VANCOUVER ART GALLERY. MADE POSSIBLE BY SUPPORT FROM CONTINENTAL BANK OF CANADA. ASSISTED BY A GRANT FROM THE CANADA COUNCIL.

PORCHLIGHT, 1972. Oil on Board. Collection: Mrs. Christine Pratt

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Learning About Our Past and Preserving Our Present

Though each issue of *Rotunda* contains articles on diverse subjects, it is interesting to see the common themes that are discussed in the individual articles. In this issue our feature articles cover animal conservation, ancient fossils, Canadian textiles, and trains. These stories all deal with the importance of learning about the past in order to better understand and preserve our present.

One day last fall, I received a telephone call from Alex Powell of the CBC. He had just returned from an extensive trip to Russia, where he had been involved in the production of a new television series featuring zoologists Gerald and Lee Durrell. The series, *Durrell's Russia*, was about animal and plant conservation programs in the Soviet Union; Alex wanted to know if we would be interested in seeing some slides that he had shot on location. Alex's enthusiasm was extremely infectious and it sounded as if all the ingredients were there for a good story. And so we arranged a meeting at the Museum.

His pictures portrayed an incredible range of landscapes and animals that have been saved from extinction by many dedicated Russians. These images reflected the theme of the television series: the other Russians about whom we in the West never hear, although they are the ones with whom we may have the most in common.

Here was definitely a story for *Rotunda* and no one could write it better than Gerald Durrell, who happened to be in Toronto with his wife Lee to record the voice-overs for each television episode. Durrell agreed to our request and managed to write the *Rotunda* article while on a quick trip to Madagascar that he and Lee took during a break in the television production schedule.

The publication of an article by Durrell is, in itself, a special occasion, but our meeting was also very special. It was probably the only time in my life that I will ever meet a man who has been bitten on the toe by a near-sighted bustard in Askaniya Nova.

The vast changes that our planet has undergone are nowhere more vividly demonstrated than in the fossil record. Palaeontologists must ascend the heights of the Rocky Mountains to find remains of the diverse, often bizarre life-forms that lived in the ocean that covered the area 530 million years ago. First evidence of these fossils was found in 1909 in what is now commonly known as the Burgess shale. Desmond Collins explains how he exposed, in recent years, not only new localities of Burgess shale but also a locality on Mt Stephen that contains the remains of at least one animal that predates those found in the Burgess shale. Some of these fossils have body patterns that do not relate to any kind of animal known to modern science, although many of them are presumed to be the predecessors of known animals species.

There is probably nothing more satisfying to a scholar and a curator than the opportunity to discover and to explore a new subject. As Adrienne Hood explains, the unexpected delivery of a 19th-century Canadian coverlet to the Museum in 1941 led Dorothy Burnham to suspect and then to prove that Canada has its own distinctive handweaving tradition. Forty-five years later, the founder of the Museum's Canadian textile collection, the author of several popular books on textiles, and a member of the Order of Canada, Dorothy Burnham continues her research with the same dedication.

I've always had a soft spot for trains. Omer Lavallée describes the establishment of the Champlain & St Lawrence Rail-Road, Canada's first public railway, and the maiden trip of the *Dorchester*, the company's first train, one hundred and fifty years ago. Although for long distances air travel is now more popular than train travel, the romantic image of a transcontinental train has not really waned; and the cheapest and most efficient way to transport heavy freight for long distances overland is still by rail.

We would also like to draw your attention to the first of a new series of articles in *Illuminations*, by T. Cuyler Young, Jr, director of the ROM. In this issue of *Rotunda*, he discusses the problems of marketing cultural institutions.

Rotunda may cover a broad range of topics and themes, but there are surely others that our readers would like to suggest. We hope that you enjoy this issue of *Rotunda*.

S.S.

ROTUNDA

the magazine of the Royal Ontario Museum

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Cover: The desman with its frenetic behaviour and its long nose was one of the most endearing creatures that Gerald Durrell met in the Soviet Union. Turn to the story on page 20. Photo by Alex Powell.

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Editorial and Marketing Offices
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ALL LUXURY SEDANS ARE NOT CRE

The BMW 735i is not, of course, the only large luxury sedan. But it is, we believe, the only genuine *sports* sedan among large luxury cars.

To our mind, the BMW 735i is the sole large luxury sedan designed to be driven with a generous dash of spirit. It accelerates, brakes and manoeuvres with a dexterity and verve that places it squarely in the high-performance category.

As such, the 735i does more than proclaim its owner's commitment to quality of goods: It demonstrates a commitment to the quality of *driving;* it appeals to people who insist that a large car should not be cumbersome.

It is BIG. The BMW 735i offers more than impressive performance. Passengers find it truly BIG, with room to spare, room to spread out, room to luxuriate.

Its appointments are genuinely luxurious. For instance:

Dash and doors are trimmed with kingwood, a dense, fine-grained hardwood from the rain forests of the Amazon basin. Its muted grains are in tasteful complement to the glove-soft leather upholstery, its hides meticulously matched. Front seats not only warm up on cold mornings, they remember *exactly* how you like them positioned; a touch of a button returns them to the ideal position.

There is eight-speaker stereo sound for the ears, and a rear window sunshade to keep the light from dazzling the eyes. (Small point—until you're heading west in the early morning or east in the evening.)

Shared principles. The BMW 735i may well stand alone in its unique blend of superb performance and inner luxury. But in its basic principles, the 735i is *not* alone. It shares them with its smaller, less costly brothers. For this good reason: *BMW does not treat its principles as an optional extra.*

For example, the most junior BMW, the 325, costs about half the price of the 735i. Yet the 325 is built the same way. With the same engineering tenets, the same finicky attention to detail.

Examine the 735i and 325 closely and we warrant you will not be able to discern differences in how snugly a door fits, or how smooth the paintwork. In such matters of basic quality, BMW does

TRX wheels and tires, as shown, are optional.

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not reduce its standards.

Similarly, computers that tell you when to take the car for service, or when a light bulb has burned out, or what the optimum fuel/air mixture is at any given instant, are standard fare on *all* BMWs. Which leads us to this:

If the biggest BMW is the perfect choice for people who like a large car with performance that belies its size, what kind of people might be attracted to the more compact BMWs?

Essentially, they are the same people. People who like to feel quality and taste around them. People who like to own a car that complements their ability to drive with skill and, on occasion, spirit. Whether the car is big, small or in-between.

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Value Driven, Market Oriented

PHOTOGRAPHY DEPT. ROM

The Royal Ontario Museum, Toronto

"A Disneyland with real dinosaurs." A journalist who is a supporter of the Museum recently asked whether I thought the Museum was heading in this direction. His concern is serious. It is a reaction to the common perception that the Museum is becoming more and more focused on developing its market—on playing to the public in order to get more people into the building to view galleries, special exhibitions, and programs, and on taking its programs outside the building to an ever-widening audience. Does the Museum's emphasis on marketing run the risk of sacrificing to the whims of the public the quality and the long-range value of what it does?

The problem of values versus marketing is characteristic of all cultural institutions, not just museums. Cultural institutions are under great pressure to increase contact with the public. Much of the pressure comes from within the institutions, but some critics contend that the government and the public also are pushing cultural institutions to be too concerned with popularity, and to overemphasize easily measured criteria of success such as the size of their publics.

I think that if the Museum ever did become *market driven*, then it would very quickly become a shallow and insignificant operation, mostly doing things which could not be justified in an organization claiming to be a major cultural asset for the present and future community. Therefore, any museum (or art gallery, or opera company, or ballet, or theatre troupe) must be very careful not to allow itself to become market driven.

On the other hand, like any well run business in the modern world, there is no harm in being market oriented while *value driven*. I would claim that this stance is not new and that it is one which the ROM and all other museums have always taken. (Maybe some people are concerned and upset because today we are approaching our market orientation a little more professionally than we once did.) I would also argue that a value driven, market oriented approach is one that is common in our society, even in the commercial world, and that government and most of the public would applaud and support our efforts not to sacrifice our values in our search for markets.

To illustrate my assertion that academic museums like the ROM have always been market oriented, let me choose an extreme example, the curator-scholar. The curator is viewed by many (even by some in the Museum) as living in the proverbial ivory tower, interested only in the pursuit of pure knowledge, and oblivious of the "real world". (I use quotation marks because I have yet to find a "real world" beyond death and taxes, two things even supposedly myopic curators confront.) Some curators (scholars) possibly fit this description. The best do not.

Charles Darwin, whose theories are the starting point of thought for all curators in the life sciences, was not just interested in the pursuit of truth for its own sake. He was anxious to convince the world of what he had discovered and synthesized. Now *convincing* people of the value or truth in an idea is just a more genteel way of saying that one is *marketing* an idea, that is, getting people to buy it. Darwin was not very good at this and so the task fell into the hands of a marketing expert, Thomas Huxley. One could claim, for the sake of making the point, that without Huxley we might still believe with Bishop Ussher that the world was created in 4004 B.C., for Darwin's proposition might have been lost.

A good curator-scholar writes academic papers, gives lectures, and helps to build galleries precisely because she or he is driven by the need to convince the reader, the listener, or the viewer; or, if you will, to market the results of curatorial labours. Now, if I have shown that curators have always been market oriented, then it is much easier to demonstrate that the same historic truth holds for the whole Museum. We have always been concerned with our market and with selling the Museum to it.

Many people, particularly intellectuals and others who may have little contact with or natural sympa-

thy for the world of commerce, tend to assume that it is purely market driven. I could be persuaded that such is the case after spending a Sunday afternoon watching football on television, as well as all of the ads that are broadcast between plays. Yet to choose but one possible aspect of behaviour in the world of commerce that is anything but purely market driven, let us look at business's constant pleas for protective tariffs and government subsidies.

If commerce were always market driven (*à la* John Stuart Mill), we would have no such tariffs or subsidies, for their *raisons d'être* clearly violate the philosophy of a purely market economy. As a society, we Canadians value having honest work to do. We value the cultural institutions that a strong economy can make possible. We value remaining distinct in the world as a culture and so we realize that we must remain distinct as an economy. These are all worthy goals which we express through government in a way that clearly illustrates that our commercial world is not just market driven. Were our society as a whole so driven, we would let the Maritimes sink into the Atlantic Ocean and the Canadian shoe industry walk entirely on its uppers. And there would be no debate about free trade with the United States; the issue would be settled purely on arguments based on market drives.

Our reaching out to our market—both for its own sake and for ours—is not an act that need erode the quality of the Museum's product. If we are clear in our minds about the Museum's values and honour these values as we should, then the Museum can be market oriented while remaining value driven. Create a first-class product of high academic and museological quality, and then market it for all its worth. This is something the Museum has done well before, and something that the world beyond museums well understands.

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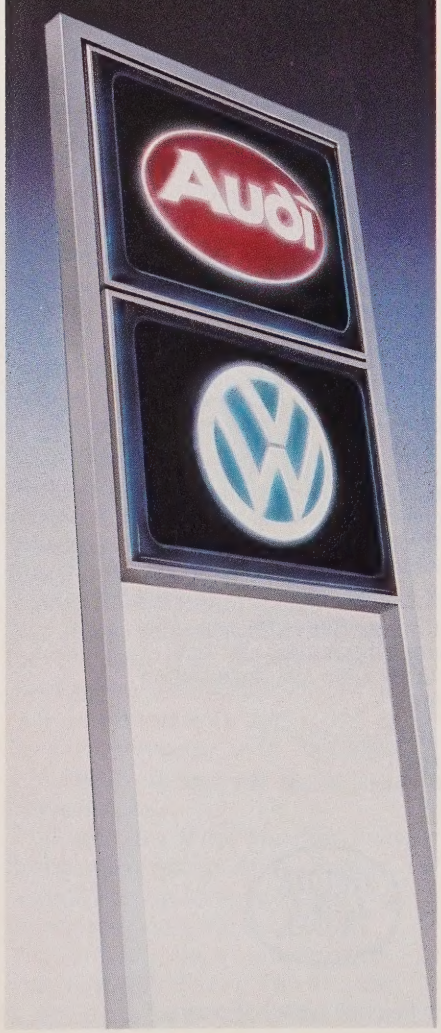

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Physic in Flower

GLORIA VARLEY

A grey May day at the Chelsea Physic Garden

On a mild May afternoon, the Chelsea Physic Garden lies quiet under a persistent gentle rain. The soft light appears to brighten from time to time, then subsides, leaving only the vivid bursts of blossom to mimic sunshine. Outside the walls, on Royal Hospital Road and the Chelsea Embankment, London's raucous traffic rushes by. But inside, enclosed against time and turbulence, the Physic Garden maintains a calm quite as soothing as the curative powers ascribed to some of its plants.

This present-day oasis was founded in 1673 by the Worshipful Society of Apothecaries (or pharmacists), who filled the role of general practitioners at a time when surgery was left to barbers, and physicians busied themselves more with theory than with the practical realities of medicine. Named when the word physic still kept its original sense of "pertaining to things natural", the garden was intended as a centre for research and education in botany as well as medicine. At its inception in a Chelsea of hayfields and meadows quite unlike the bustling district of today, botany was still firmly linked to the healing arts and herbalism of medieval times.

Certain portions of this accumulated knowledge retain their value even when subjected to modern scientific investigation. The main difference lies in application. Now, most likely, treatment involves drugs synthesized from plant sources. In former times it was more usual to administer a simple cordial, purge, or powder, which was developed from the actual flowers, seeds, leaves, or roots.

Other early beliefs, however, haven't stood up well to the test of time. Take the Doctrine of Signatures for example, put forward by the intemperate would-be medical reformer Paracelsus in the 16th century. Plants, so the theory went, could be enlisted in the battle against disease or disability by interpreting the riddles displayed in their forms, colours, and habitats. Thus a plant with heart-shaped leaves should counter cardiac ailments, while one with yellow flowers would no doubt remedy jaundice. Given the spread of such assumptions, it was natural for investigators to regard every plant as potentially beneficial, and to search vigorously for new species to add to the armamentarium. Although the basic premise was doubtful, a resulting increase in knowledge more than compensated.

Over the years, Chelsea has had its share of scientific glory under brilliant gardeners and curators, and periods of diminished reputation and confused purpose as well. One of the bright spells came when the wealthy and influential doctor Sir Hans Sloane (whose collections of

antiquities and scientific specimens were the foundation of the British Museum) bought the Manor of Chelsea, and with it the garden, in 1712. Sloane had studied there during his early medical training and in 1722 virtually refounded it "on condition that it be for ever kept up and maintained by the Company as a physick garden". He was also responsible for appointing Philip Miller gardener; Miller subsequently burnished Chelsea's reputation until it was considered the finest botanic garden in the world. During his fifty-year reign, cotton seeds were first sent out to the new colony of Georgia, and many species from the Americas and elsewhere found their way to Chelsea and so on to wider distribution.

Plants gathered from abroad were dispersed through an exchange of seeds and cuttings with other physic gardens, including those at Leiden, Paris, and Oxford. As well as aiding scientific research, plant exchanges had down-to-earth practical value. With the invention of the Wardian Case (a device like a small sealed greenhouse) in the early 1800s, it became possible to transport living material around the world. Chinese tea plants were introduced to the Himalayan foothills of India in 1846. Thirty years later Brazilian rubber was on its way to Ceylon and Malaya. Over time, such projects changed the agricultural economies of whole countries.

Today, strolling around the Physic Garden, visitors can gain a sense of the importance plants hold in numerous human endeavours. First to catch the eye may be the botanical order beds. Unlike the colourful jumble often found in ordinary flower plots, these display herbaceous specimens in strict family groups. Here, buttercups and their relatives; there, iris; further on, lilies; and so forth. Peonies, part of the buttercup tribe, *Ranunculaceae*, range from single-flowered plants with foliage like tufted fern fronds to the familiar red of cottage gardens with their shaggy blooms and deeply-cut leaves. The Chelsea garden's arrangement was particularly designed to show a possible evolutionary sequence. Similarities and differences become apparent, textbook relationships make more sense.

Important as these beds are, they cover only a third of the garden's four-acre site. In addition, there's a herb garden with modern and historical plants used in medicine, cookery, and dyeing. One of the finest trees is an olive, the largest in Britain, that thrives so well in its mini-Mediterranean microclimate that it ripens as much as seven pounds of fruit per year. There's a rock garden, Australasian plants, both Californian and Chinese borders, ferns, shrubs, South American plants, a woodland garden, pools—indeed, enough to provide interest for many visits throughout the year.

Much of the lore current when Chelsea was founded has fallen into disrepute. Yet there remains the age-old hope of finding panaceas in the homely guise of plants. Botanical gardens flourish in many parts of the world, some primarily devoted to medicinals, others with farther-ranging collections. For anyone with an eye to the history of health care—or simply a love of unusual gardens—they offer unending fascination.

Happily, Ontario now has its very own "physic garden", officially opened last October at the Royal Botanical Gardens in Burlington. And in one of those not-so-accidental quirks of fate, the R.B.G.'s director, and the man responsible for instigating its medicinal garden, is Allen Paterson, a former curator at Chelsea.

It will take the Burlington garden a while to become as well established as its sister across the Atlantic. And, indeed, its character is quite different (as is often the case with siblings). But as sprouts appear this spring—wild ginger, foxglove, vinca rosea and all the rest—visitors can relish the pleasure of happening upon a garden in its burgeoning phase, yet, even so, a conscious caretaker of the past where wonders may one day be discovered.

GLORIA VARLEY

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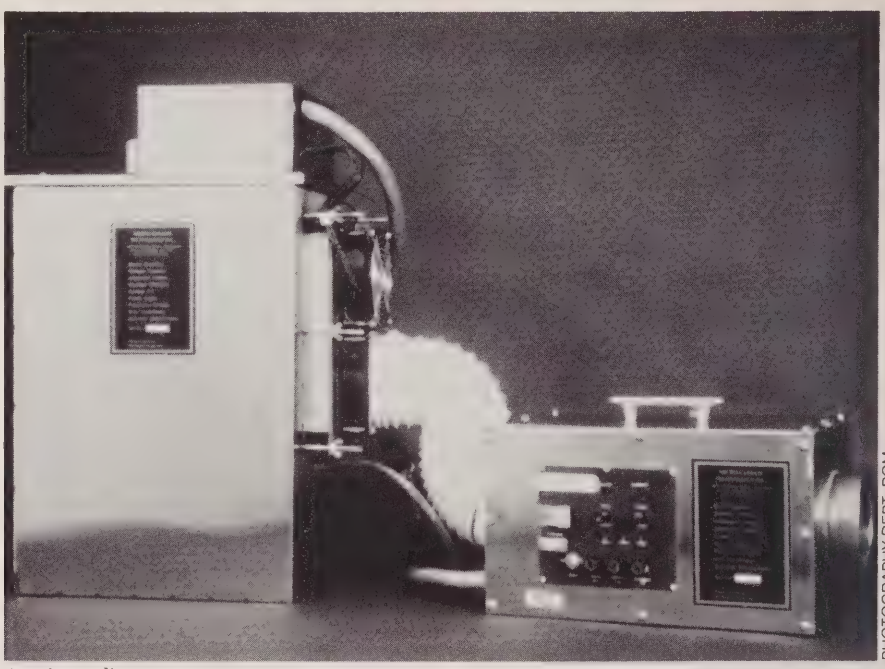
What are M-C-G's?



PHOTOGRAPHY DEPT. ROM

A micro-climate-generator

A museum's reputation is commonly based on the quality and size of its collections. However, some of the display cases in the renovated galleries of the ROM have an unusual component that also is attracting attention from many of the major museums in North America. These cases are distinguished by a pair of inconspicuous holes, merely 1 1/4 inches in diameter, and several tiny lights that are located in their bases. The holes and lights are features of a small machine called a micro-climate-generator.

A micro-climate-generator is like a small, quiet air conditioner, hidden inside the base of a display case. It controls the climate inside the case by taking in air through one duct, adjusting its temperature and moisture content to the required level, and then pumping it back into the case through a second duct. The tiny lights in the case indicate the working condition of the machine.

The renovated Museum has some special storerooms where the relative humidity is kept at a constant level for objects with special environmental needs. The problem was to maintain the same environmental conditions in the new gallery display cases.

There are many objects that, because of the nature and behaviour of the materials used in their construction, require particular environments in order to remain in stable and good condition. For example, wood expands and contracts as it responds to a rise or fall in relative humidity. The thinner the wood, the faster it responds. Stringed instruments, made of curved sheets of wood, are very susceptible to fluctuations in relative humidity which cause dimensional variations, cracking, and warping. Museums prefer to keep wooden musical instruments at a steady fifty per cent relative humidity. By contrast, metals should be kept in a dry environment. Ancient bronzes from archaeological sites are particularly

PHOTOGRAPHY DEPT. ROM

Figure of a bronze *apis* bull with massive bronze disease. The artifact will be mechanically cleaned to reveal its original shape. Immersion in a solution of benzotriazole will help to stabilize the object and is the first step in the treatment and prevention of bronze disease. To further protect the artifact, it will be returned to a climate-controlled showcase.

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vulnerable to a form of corrosion commonly called bronze disease, which occurs with increasing rapidity as the moisture in the air increases. This destructive corrosion can be almost eliminated if the relative humidity of surrounding air is kept below thirty-five per cent.

Micro-climate-generators will be used most often in galleries where only a few of the objects require special environments, and where these needs vary from object to object. In very large display areas where the great majority of objects require the same relative humidity, vapour barriers and double-glass doors can maintain the atmosphere at the required relative humidity.

The micro-climate-generator was invented in 1984 by a new Canadian company, Micro-climate Technology, Inc. Though not a ROM invention, the micro-climate generator was constructed to meet the Museum's specifications, and it was tested for months in the Museum. It surpassed all expectations, and has proved to be of interest to other institutions that also need to keep objects on display in stable environments. By early 1986, Micro-climate Technology will have demonstrated its product at the McMichael Canadian Collection, the Detroit Institute of Art, the Smithsonian Institution in Washington, and the J. Paul Getty Museum in California. Other Canadian and American museums have also expressed interest.

The Royal Ontario Museum has plans to use the M-C-G in places other than gallery display cases. In future, it hopes to use micro-climate-generators with ROM Outreach exhibitions, which travel to institutions throughout the province. It will then be possible to include in these exhibitions objects which because of their sensitivity to environmental changes, at present are precluded from travelling.

SUSAN WILSON

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Samuel de Champlain,
Les Voyages, 1609

PHOTOGRAPHY DEPT. ROM

Officer's Trophy Room, 1846, by Cornelius Krieghoff, oil on canvas, Sigmund Samuel Collection, Royal Ontario Museum. The officer's room is decorated with Indian "curios".

Samuel de Champlain is best known as an explorer; there are probably few who imagine him as a collector of native souvenirs. Yet to Champlain the belt of porcupine quills that he sent home to his monarch was a memento of his journeys to the New World. Champlain could not have predicted, when he acquired this souvenir, that the collecting of souvenirs would develop into an extensive trade, which in turn would affect the evolution of native and non-native relations.

During the initial periods of contact between natives and Europeans in Canada, many Europeans viewed the native goods they collected as curiosities or as natural history specimens. As western European society began to expand into North America, the lifestyles of the Indian and Inuit were altered dramatically. Farming and fur trading became means of subsistence in addition to traditional hunting and gathering, and sales from souvenir craft production became an important source of income for many native communities. With the passage of time, the souvenir trade became an entrenched enterprise subject to the demands of the expanding European-Indian market economy.

An early impetus for the development of the native souvenir market was provided by missionaries. As early as 1639 the Ursuline nuns established a school for girls in Quebec. Both this and other mission schools founded later were dedicated to teaching native children about Christianity and the skills of European society. Among these skills were craft techniques such as using metal needles and scissors for embroidery. Many of the goods produced by the native children were shipped back to Europe, where they stimulated an interest in native souvenirs.

COURTESY BRIAN MUSSELWHITE

Native women selling their craft goods to tourists at Niagara Falls, c.1850s. Stereograph by Platt D. Babbitt, collection of Brian Musselwhite.

As more native women and girls became familiar with the new techniques and with European decorative designs and objects, and as the availability of goods such as commercial cotton or silk thread, glass beads, cloth, and tanned hides increased, the production of native souvenir items blossomed. Traditional native decorative arts, including quiltworking, painting, and moosehair tufting, remained a part of the manufacture of souvenir goods, but many non-traditional tourist items were produced to meet the demands of the European market. Tea cosies, doilies, card trays, scissor and fan holders, picture frames, and pin cushions of European design were decorated with native and European-inspired patterns.

Missionary-run Indian schools, funded by the Canadian govern-

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Silver gorget, 18th-century English manufacture, engraved with the royal coat of arms of George III, and bearing the inscription "by order of His Royal Highness". This gorget was given to Joseph Brant, the distinguished Iroquois chief. Collection of the Royal Ontario Museum.

ment, were established mainly on reserves in the 19th and 20th centuries, in an effort to implement the government's policy of assimilating the native peoples into Western culture. The schools emphasized crafts that produced non-traditional goods, and vast quantities of these items were sold by the missionaries, often to provide further funding for the schools.

By the late 19th and early 20th centuries, traditional handcrafted production eventually had given way to more commercial mass production. Factories were established where moccasins, mittens, miniature canoes, and other tourist goods were produced to standard specifications. The price of production efficiency was a smaller variety of styles and decorative motifs.

The two world wars and the Depression brought many types of souvenir production to a standstill. The finer labour-intensive piecework that was still being made could not produce enough revenue, and thus many craft skills were no longer taught to the children.

During the second half of the 20th century, there has been a revival of native culture in many native societies, influenced by the rise

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A black velvet tea cosy, decorated with glass beads, lined with cotton. Although European in design, the tea cosy is executed in a native style, possibly by a student of a missionary-run reserve school. Athapaskan, c. 1880, collection of the Royal Ontario Museum.

of Indian activism and pan-Indianism. Since arts and crafts are an important means of conveying the new emphasis on the symbols of native culture, there has been a renewed interest in traditional craftwork. Indian and Inuit cooperatives have evolved to control more of the manufacturing and retailing of native products.

In the souvenir market, native products were exchanged for European goods and money. But European mementoes were also used to obtain Indian favours; often symbolic gifts were given to Indians in the hope of manipulating or influencing their behaviour. Presentation-pipe tomahawks or peace pipes, for example, were important as gifts for cementing a friendship or sealing a treaty. British decorative trade silvers such as gorgets and bracelets were frequently bestowed on Indians; the quantity and the quality of the silvers denoted status. "Chief's" or "captain's" coats modelled on British military costumes were used extensively to reward Indian leaders who became European allies or who served as heads of fur hunting groups.

In the 20th century, the native peoples have turned this practice around. A non-native politician or dignitary might receive a "traditional" Plains Indian head-dress and perhaps be oblivious to the fact that the head-dress is made of turkey rather than eagle feathers.

Since World War II many new types of native souvenir crafts, inspired by traditional native cultures but executed in contemporary styles, have appeared. Many of these souvenirs such as Inuit sculptures and prints, and contemporary Woodland and Plains Indian paintings, are regarded as fine art by non-native society, and the development of some of the new art forms has been encouraged by non-natives who have perceived a potential market. Most of this art, however, springs from a combination of the artists' aesthetic sense and creativity and their response to what is, in fact, a souvenir market.

Traditionally those interested in the material culture of native societies have disdained the study of native souvenir goods. Such objects were either simply ignored, or considered worthless; they were not "really" native or they were too modern to be taken seriously. Attitudes have changed, however, and today both historical and contemporary native souvenir arts are considered to be eminently collectible, valuable, and worthy of study. Museum curators who once disdained these items are now paying premium prices for them.

VALERIE GRANT

PHOTOGRAPHY DEPT. ROM

Stylized golden eagle, 1984, by Ben Thomas, a Mohawk sculptor of the contemporary school of Iroquois steatite carving. Collection of the Royal Ontario Museum.

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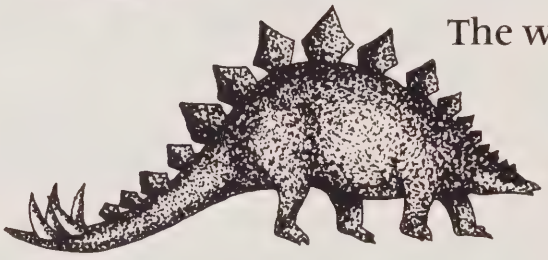

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Plant Alert

What to Watch for in the Spring

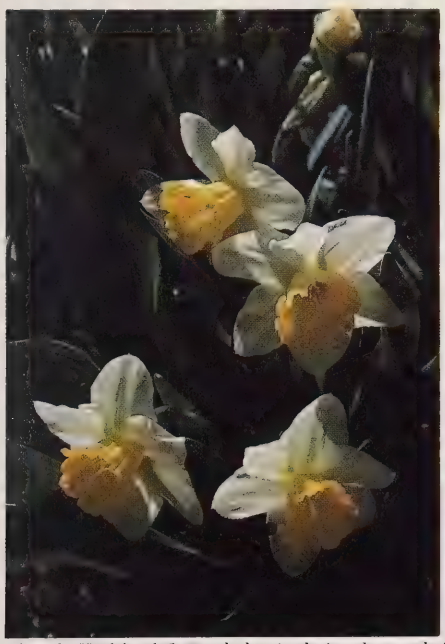
"I just found my son playing with some berries from the neighbours' tree. I don't know what kind of berries they are and the neighbours aren't home. I'm pretty sure he didn't eat any but I was told you would tell me what they are; are they poisonous?"

The voice on the other end of the telephone line was frantic and almost incoherent, but one that I have dealt with many times. This was a poison control call, and trying to answer such inquiries is one of the public services of the botany departments of the Royal Ontario Museum and the University of Toronto. The Poison Control Centre at the Hospital for Sick Children receives more inquiries about plants than about anything else, and up to thirty calls per month may be forwarded to the ROM. Most of the plants that have been eaten are not poisonous, but to be certain, one must be able to identify them.

I calmly interrupted my caller with a series of well-practised questions that are used to identify plants. These are questions that everyone, not just professional botanists, should ask. First, is it a plant which is found in the house, in the garden, or in the wild? When this is established, I ask the caller to describe each part of the plant and how the parts are arranged. As a professional botanist I know what grows in a particular season, as well as what is commonly eaten, and so I can direct further questions accordingly.

For this call my questions were as follows: Is the plant wild or do you think that it was planted? Is it a shrub, a plant which branches from the ground, or does it have a main trunk like a tree? Do you have a branch with berries and leaves on it? If not, please get one. How are the leaves arranged on the branch? Are they opposite one another, or do they alternate on either side of the branch? How big are the leaves? What shape are they? Are they hairy? Where is the fruit growing? Does it grow in clusters or singly? What colour is it? Squash a berry; how many seeds are there? How big are the seeds? Does the berry have a particular odour?

Throughout this conversation I was constructing an image of the plant in my mind, sometimes draw-



COURTESY BOTANY DEPT. ROM

The daffodils *(left)* and the jack-in-the-pulpit *(right)* are spring flowers that are pleasing to the eye but poisonous to the palate.

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ing it, sometimes flipping through the pages of a book to get clues. In this case the plant was a Tatarian honeysuckle (*Lonicera tatarica*) and it was harmless.

Usually the plant is common and I can readily identify it. At other times I must consult textbooks or check my clues against specimens in our reference collection. Occasionally I consult another botanist. If all else fails, I tell the caller to take the plant to the nearest garden centre in order to obtain a positive identification. Most often though, having identified the plant I tell the caller to call the Poison Control Centre to discover if the plant is poisonous. Our duty is to make identifications; it is the Centre's task to assess toxicity and to make diagnoses.

A number of plants contain toxins, which are substances that serve to protect the plant from being eaten. Fortunately, however, most of the plants that are eaten by children are not poisonous. Even if they are, the quantity ingested is usually insufficient to do much harm, and few people are hospitalized.

A few simple precautions may be taken to avoid plant poisoning. The first is to learn which plants are dangerous, where they grow, when they grow, and what they look like. It is best to begin by examining plants in your immediate environment, observing their basic characteristics, and learning to describe them. Here are some plants to beware of in the spring months.

Daffodil (*Narcissus pseudo-narcissus*): a common spring garden flower containing glycoside toxins that may cause abdominal pain, vomiting, diarrhea, and shivering. The toxin is present in all parts of the plant but especially in the bulb. Daffodils flower in April and May. The leaves and flower-stalks sprout from the bulb and are smooth and linear, with parallel veins. The flowers of different varieties are usually yellow, orange, or white and are distinguished by tubular petals in the centre with six or more separate petals, often of a different colour, surrounding them. The bulbs re-

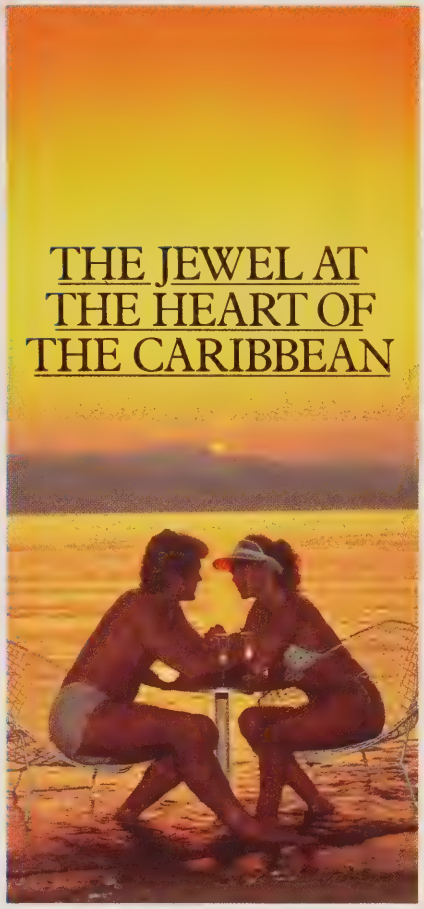
semble onions. The same toxins occur in other spring flowers that grow from bulbs, especially tulips and hyacinths.

Lily-of-the-valley (*Convallaria majalis*): an early spring garden plant that usually carpets shady areas. It is a member of the lily family. The plants grow to about ten centimetres in height and consist of two smooth, narrow leaves with parallel veins, and a flower stalk with many small bell-shaped white flowers, each on its own stalk and nodding downwards. The flowers are fragrant. The fruits are small red berries about one centimetre in diameter. Lily-of-the-valley contains glycosides in all of its parts, especially the roots. These toxins, like digitalis, cause irregular heartbeat and upset stomach.

Jack-in-the-pulpit (*Arisaema triphyllum*): a wild plant native to North America that grows in damp forests, beginning in May and persisting through the growing season. It is a distinctive plant with leaves that are striped with green and white or green and purple, inrolled, and enclosing a tongue-shaped flower; one of the leaves curls over the top of the flower and hangs down in a point. In the autumn this plant has a large clump of red berries. Jack-in-the-pulpit belongs to the Araceae, a family with many species that contain the toxin oxalic acid in the form of oxalate crystals. These are spiny crystals found in the leaf and stem tissue. Contact with oxalate crystals causes inflammation of the tissues and subsequent swelling and irritation. In severe cases, its victims may have trouble speaking and breathing.

Rhubarb (*Rheum rhubarbum*): The leaf stems of this plant are commonly eaten as a vegetable. The leaves, however, contain oxalate crystals and if swallowed, cause extreme swelling of the tissues of the mouth and throat. Like jack-in-the-pulpit, in severe cases, the plant causes its victims difficulty in speaking and breathing.

DEBORAH METSGER



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The Other Russians

We in the West never hear about the other Russians although they are the ones with whom we may have the most in common.

Gerald Durrell

THE other day, a friend of mine, on hearing that my wife, Lee, and I had just returned from filming in the Soviet Union for our television series *Durrell in Russia*, asked us round for "a quick drink so you can tell us all about Russia".

Ten months in the Soviet Union had resulted in our having travelled 250 thousand kilometres, and having exposed over fifty kilometres of film in nineteen different locations, ranging from the tundra above the Arctic Circle, to the steppes and lakes of Siberia, to the deserts on the Mongolian border. We travelled by an extraordinary range of transport from horses to helicopters, camels to canoes, trains, planes, snowmobiles, and hovercraft. So, to try and describe all this over a quick drink was like asking us to engrave the Old Testament on the head of a pin.

What we have tried to show in the thirteen part series we have filmed is not only the conservation of animals and plants in the Soviet Union, but the people who are responsible for this important work. These, the animals and the humans who guard over them, are the other Russians, the people and creatures we in the West never see on our television screens. We visited at many different times of the year, so that we could show this vast country in all its moods—under a white shawl of snow, jagged with icicles in the iron-hard winter; a rainbow of sweet-scented flowers in the spring, the air vibrating with an orchestra of bees and birds; the brilliant blue skies of summer, when the pine woods are crackling with heat and the wild strawberries glow in the hedgerows like scarlet lanterns.

We filmed the great floods at Oka in central Russia when the river's muscles are flexed and the ice is broken into a giant's jigsaw puzzle, trapping animals such as hares and badgers on ever-shrinking islands. Miles of water separate these creatures from the safety of dry land and so, like so many Robinson Crusoes, they have to be rescued. The Oka Reserve staff set out in a fleet of motor boats for this cold, wet rescue work, and in a very short time the boats were filled with a cargo of damp, bedraggled and ungrateful animals: hares with starting eyes, like spinsters expecting a fate worse than death; snarling foxes, eyes almost green with rage; and bad-tempered, teeth-gnashing badgers. All these and a host more of deer, desman, and raccoon dog were ferried to the high ground and released.

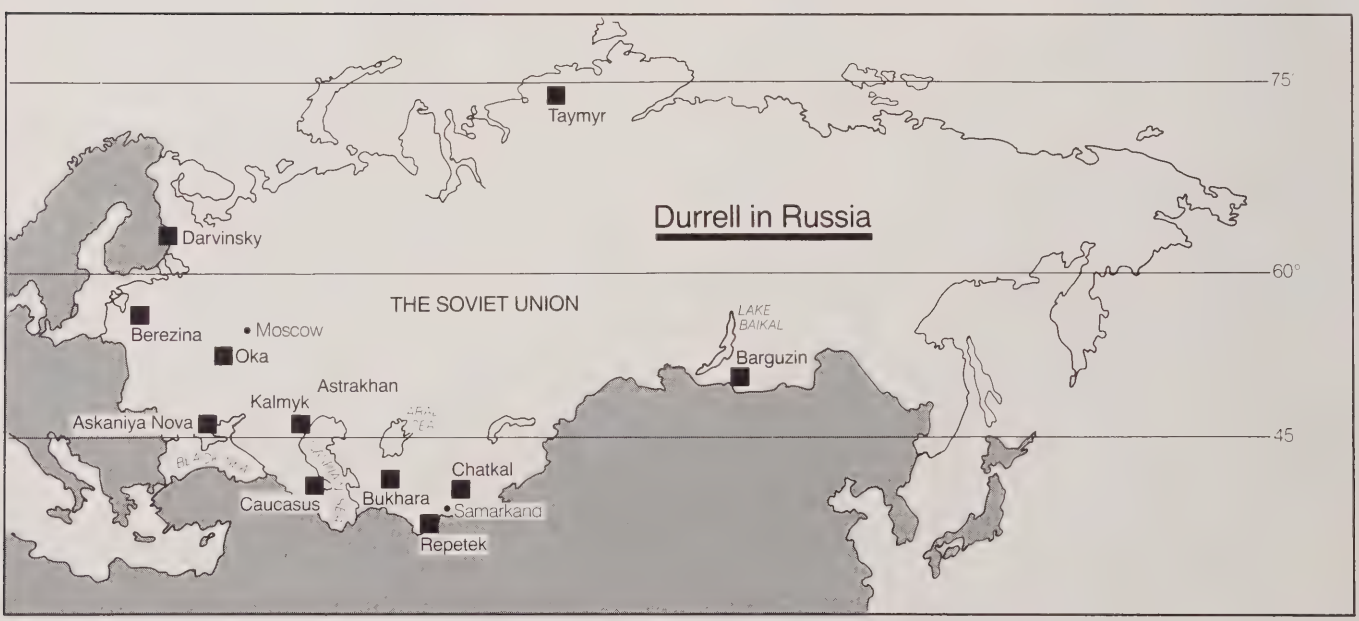
At Oka, too, we saw the new facilities for the captive breeding of birds of prey. Here there were beautiful golden eagles, their plumage all the subtle browns of autumn leaves; huge griffon vultures, humpbacked, baldheaded, in their cloaks of feathers, and, perhaps the most lovely of the birds of prey, the

Opposite page: Gerald and Lee Durrell standing on the edge of Lake Taymyr at *midnight.*

The bearded vulture is known as "the bone cracker" from its habit of dropping big bones (and unfortunate tortoises) onto the rocks from a great height.

lammergeier or bearded vulture, with its long, curved beak, its mask and beard of black feathers, the fiery scarlet rim to its eye and, on its wings, a waterfall of feathers in delicate shades of cinnamon and caramel browns. All birds of prey are strictly protected in the Soviet Union now, and their numbers are increasing gradually.

Now it was the beginning of the spring thaw, and so the capercaillies were working themselves into a frenzy of love. These magnificent birds have been much overhunted in the range and so, at the Darvinsky (Charles Darwin) Reserve, a series of gigantic breeding aviaries have been established, and the progeny from this experiment are used to restock forests where the bird has been shot out. In each aviary, a huge cock bird strutted and called around his soberly dressed harem of hens. And what glorious heraldic-looking birds they were, clad in shining blue and dragon-green plumage, smart white epaulettes on the brown wings, and a tail of deep blue feathers marked in white, fanned out stiffly like a turkey's. They wore long, feathered pantaloons down to their huge feet, and this fabulous ensemble was rounded off by a feathery beard under the horny, caramel-coloured beak, and above the hazel eyes, fleshy red crescents of bare skin, like carunculated new moons, that gave the bird a most military appearance. The song was ventriloquial to the extent that the two sounds made were so different, it was hard to believe they emanated from the same bird. The first sound is a deep, honking interrogative noise, like someone tapping a drum. The next sound, in answer, is an extraordinary high-pitched, husky nasal bab-



ble. Strutting around, tails as stiff as Victorian fans, eyes shining, throwing back their heads to sing, they were some of the most extraordinary avian troubadours I have ever seen.

A fascinating reserve lying in what is the last area of genuine steppe left in the Soviet Union is Askaniya Nova on the shores of the Black Sea. It was started by the Falz-Fein family in the days of Catherine the Great, when that incredible monarch was endeavouring to get people to settle on the rich earth of the steppes. The ancestors of the Falz-Feins purchased land, and over the years Askaniya Nova came into being. It was a very extraordinary experiment and one that is still progressing today. First, the family set up at Askaniya Nova a very important breeding station for domestic animals, evolving over the years important breeds of horses, cattle, and sheep. Then they decided to see what animals from different parts of the world could be acclimatized to steppe conditions and might, by cross-breeding, assist them in their work of creating new domestic breeds. Soon one could see on the steppe herds of llama, zebra, eland, North American bison, and a host of others. As Askaniya Nova's fame grew, it received many important visitors from Tolstoy to Czar Nicolas II who, so impressed was he by the work being done, raised the Falz-Fein family to the aristocracy, this in spite of the fact that he was pecked on the foot by a great bustard during his visit.

In its distinctly marked livery, the great bustard is the most handsome of birds.

We saw the breeding colony of these huge and beautiful birds during our stay. Attempts are being made to breed them in numbers and thus reintroduce them to areas of the steppe from which they have disappeared either through overhunting or the expansion of agriculture, always a fatal thing for a ground-nesting bird. As big as a turkey, the bustard is a very beautiful creature, its feathering embodying every shade of brown—chocolate, fawn, cinnamon, burnt sienna—imaginable. I am delighted to record that one of them—probably short-sighted—mistook me for a member of the aristocracy and pecked me on the foot.

Two other creatures we saw at Askaniya Nova that made our visit more than worthwhile were the kulan, or wild ass, and the fine Prezwalski's horse. The range of the kulan, probably the most handsome of the wild asses, once extended into the steppe land, but spreading agriculture and competition with do-

The Prezwalski's horses, which once ran wild in Mongolia, can be broken to the saddle and prove extremely tough.

Lee trying to persuade her co-star, the baby seal, to enter the water

mestic animals for grazing and water reduced its numbers drastically. Now, however, under strict protection it is slowly recovering. The Prezwalski's horse was not so lucky. It faced the same competition but became extinct in the wild state. Fortunately, however, enough specimens of this elegant gingerbread horse had been established in zoos throughout the world. From this stock youngsters are being chosen for a scheme to reintroduce this lovely animal into special areas of the Gobi Desert. It to be hoped that this international conservation effort will be successful.

Over four thousand kilometres and five time zones away from Moscow, we flew by helicopter along the length of Lake Baikal, the largest body of fresh water in the world, and landed at the Barguzin Reserve. The lake was wearing an eight-foot-deep carapace of ice but, as spring was approaching, this was splitting up. With a tremendous roar like gunfire, huge cracks would suddenly zigzag like black lightning across the white expanse of ice, some of the chasms thus created being one or two metres wide and several kilometres long. When we drove out on to the lake's surface in search of the curious Baikal seal and its young, we had to "jump" these crevasses in the jeep, a hazardous occupation, to say the least. In these great cracks, new ice was forming but, as it was continually under pressure from the movement of the old ice, this fragile coating was constantly breaking, so the air was filled with squeaks, groans, tinkles, and purring noises, a veritable ice orchestra.

After a considerable amount of searching, we found a baby seal and, after he had assured himself of our good intentions, he proceeded to accept us as a curious herd of seals who, for some reason, walked upright on their flippers instead of progressing across the ice as he did, caterpillar fashion, on his tummy. He consented to appear on television, and when his big scene was filmed, he behaved beautifully, upstaging Lee in the most seductive manner. Exhausted by his thespian endeavours, he lay quietly beside us while we ate lunch, and a curious picnic it was, for we were boiling kettles and heating food on eight feet of ice, below which, straight down, was a mile of gin-clear water.

After the flat, frozen landscape of Baikal, our next area of operations could not have been more of a contrast: the Kyzlkum and Karakum deserts in central Asia, where the sand was so hot you could have grilled a steak on it. Here in the Repetek Reserve, we saw how the huge dunes that shift to and fro like a sand ocean are best negotiated on camelback. Camels are slouching, moaning, teeth-gnashing, uncooperative and unlovely beasts, but they are ideal for this sort of terrain. They amble along over shifting sand that would make even a four-wheel-drive vehicle bog down, and they can refuel themselves from each passing shrub or tree; they require little water, and you can sit in the shade of their large moth-eaten bodies. Their droppings we found interesting, since they attracted from miles around the fat desert dung beetles. Blue-black and each the

size of a walnut, these huge, blundering insects were able to scent the camels' offerings from hundreds of yards away, and almost immediately each pile of droppings was as busy as London airport as the beetles flew in, buzzing their hind legs and propelling backwards so they soon formed a rough ball of droppings. Once they found a suitable spot, they would stop, dig a hole and bury their ball in the sand, having laid their eggs in it so that their progeny, when they hatched, would have a fragrant and edible nursery to feed on. It was amazing how clean the industrious insects kept the desert.

Contrary to popular belief, the desert is far from lifeless, though a hostile and daunting habitat. During the day we filmed a myriad of birds from hawks and the rare desert sparrows (once thought to be extinct) to the jade-green rollers and gold and black orioles, which glowed in the sparse trees like jewels. Living in the burning sands were colonies of incredibly acrobatic least weasels and "townships" of great gerbils on which they preyed. Large desert monitor lizards prowled the dunes, massive reptiles with salmon-pink skin marked in a shawl-like pattern in black, and small, agile lizards who, when alarmed, curled their tails up like watch springs. At night, a fresh set of creatures appeared: long-eared hares, jerboas bouncing like mini-kangaroos, and owls swooping down on noiseless wings to catch fat geckos, soft as velvet, patterned in yellow and black.

Northwest of the desert, we entered the great steppeland of the Kalmyk Republic, and here we met a creature I had long wanted to encounter. Probably one of the weirdest members of the Soviet fauna, the saiga is half antelope, half goat, with a grotesque, whiffling, inflatable nose like a balloon, and lyre-shaped ringed horns which, when powdered, are considered to have aphrodisiac properties by the Chinese. It seems as though there is precious little in the way of animal remains that the Chinese *don't* consider to have aphrodisiac properties, and it seems a curious preoccupation for the most overpopulated nation on earth. The saving of the saiga is probably one of the best conservation stories in the world. At one time, this animal roamed the steppes in countless thousands, but gradually overhunting and competition with domestic flocks for grazing and water whittled down their numbers until there were only a few

Camels provide an uncomfortable but sensible way of getting around the shifting desert sands.

This cormorant colony was one of the most vociferous group of birds I have met anywhere in the world. Two thousand, four hundred cormorants all speaking at once make a considerable amount of noise.

hundred left. At the eleventh hour, laws were passed to protect these strange, harmless beasts, and certain areas of steppe were set aside as reserves for them. Gradually the saiga recovered, and today there are over a million of them roving over the vast steppeland. It was wonderful to see a herd numbering many thousand passing across the setting sun, and to listen to their harsh, bleating cries as they kicked up a pink cloud of dust into the still evening air. It was nice to know they were safe forever.

From the dry apparently limitless steppes, we proceeded on to the Astrakhan Reserve, situated in the great marshy delta where the river Volga debouches into the Caspian Sea. Although this is a general reserve, it is chiefly notable for its immense concentrations of waterbirds that come here in the spring to breed. As the snow melts in the northern part of the Volga, this great river floods, and the waters pour down into the maze of waterways that make up the delta. At this moment, all the waterbirds arrive in their thousands, huge flocks of herons and egrets, spoonbills, night herons, glossy ibises, and a vast concourse of great cormorants, which have been nesting in the thick trees along the channels of sherry-coloured water from time immemorial. Their huge thick nests of sticks, like small haystacks, are added to year by year, generation by generation, and in them are reared their vociferous young. While we were filming this amazing cacophonous conglomeration of birds (everywhere you looked, you seemed to see a new species), we noticed a curious relationship between the cormorants, hooded crows and—of all things—catfish. The crows would hang around the breeding colony, lurking like bandits, and as soon as a parent cormorant had flown in from the sea, regurgitated the fish it had caught into the beaks of its babies, and departed, the crows would sweep into action. They would fly down on the cormorants' nest and set about "mugging" the babies. A few well-directed pecks, and the terrified young cormorants would disgorge their breakfasts. Some of the semi-digested fish would fall into the nest, and this the crows stole. But some of it would fall out of the nest into tawny waters below, where enormous catfish, two metres long with heads like mastiffs, circled endlessly. A quick swirl, a clop of their huge pouting lips and the largesse from the baby cormorants would vanish, and the great fish would recommence their ominous merry-go-round.

We were reluctant to leave the huge and glittering gathering of birds in Astrakhan, but we had now to depart on the last of our explorations and, as it proved, one of the most fascinating parts of our whole journey, for we were to fly up to Taymyr, the huge tundra land above the Arctic Circle on the edge of the great polar sea.

Flying over the tundra in a helicopter was a wonderful experience. The great jade-green expanse was crisscrossed with silver rivers caused by the melting snow and, here and there, rows of strange octagonal depressions with raised sides, full of amber-coloured water, that were so precise and geometric that they looked man-made like paddy fields. These were caused by the expanding and contracting of the ice in the winter. In some of these strange ponds, we

Created by the formation and melting of ice, this geometrically exact pattern on the tundra looks man-made.

were told you could see mammoth tusks and bones and, indeed, so primeval was the landscape that you would not have been surprised to see a herd of live mammoths blundering about.

We very soon saw ahead of us the first thing we wanted to film, the huge herds of migrating reindeer, thousands upon thousands of them trotting and grazing across the tundra in a forest of moving antlers. We landed near a small rocky outcrop at the edge of a valley and concealed ourselves, while the helicopter flew round in a circle, gently chivvying the animals so they would pass us. Dotted around us on the valley's rim were snowy owls, white and squat as tombstones, watching us with great golden eyes. Presently the huge reindeer herd poured into the valley, black, silver, and biscuit-brown animals, and we could hear their purring snorts, the soft pad of their hooves on the mossy slopes, and the gentle click of their antlers as two males began a mock battle. At last, having filmed them in detail and having assured ourselves that Father Christmas had no need to worry about replacements in the future, we took off in the helicopter once more and flew on to the tiny cluster of huts on the banks of the Bikada River that was to be our headquarters for the last of the filming.

Here, once the helicopter had departed, the silence was perfect, broken only by the sound of birds. The tundra consisted of, we discovered, a host of miniature trees—birches and willow—each ankle-high, growing in a thick, spongy carpet of moss, intricately embroidered with a million tiny and beautiful flowers, the whole lovely miniature garden being perched on solid ice, the permafrost. All around us, birds were nesting, for this was the season when the sun shone night and day and there was plenty of food. Jaegers, with scythe-blade wings and pointed tails, whirled and dive-bombed us, as did the herring gulls, if we got too close to their handsome eggs. Peregrine falcons nested on any tiny outcrop they could find and, inevitably, near them would be a red-breasted goose's nest, for the geese knew these falcons did not hunt near their own nests, and their fierce presence thus kept the cunning Arctic foxes away from the baby geese.

But the creatures we most wanted to meet and film were the musk ox, for not only are they extraordinary animals in their own right, but their presence on the tundra is a fascinating story. Three thousand years ago, musk ox roamed

the tundra in company with the last of the mammoths and primitive man. Whatever the reason—overhunting or a change in the weather—the mammoths vanished, as did the musk ox. In the late 1930s, the Soviet Government very sensibly decided to try to reintroduce this splendid creature and thus reinstate it on the Soviet fauna list. Tentative negotiations were started to purchase a nucleus of these animals from Greenland, but then World War II came, and people had other things to occupy them than the reintroduction of musk ox. After the war came the Cold War, so things were still not propitious to the reopening of ungulate negotiations. Then fate took a hand, for Pierre Trudeau, then Prime Minister of Canada, visited the Soviet Union. During the course of his trip, he heard about the dearth of musk ox on the tundra and immediately offered ten animals as a gift. The U.S.A. (doubtless piqued) was not to be outdone in this zoological detente and offered more musk ox. Both these offers were accepted, and in due course the young musk ox were taken on the long flight to Russia, some to found a herd on remote Wrangel Island and the rest to be released on the tundra in Taymyr. It was this herd we had come to visit.

We circled in the helicopter over the vast tundra searching for the herd, accompanied by a small and over-excited husky called Deke, whose *raison d'etre* was not immediately apparent. He sat with his nose glued to the window, whining quietly. He must have had incredible eyesight, for he spotted the herd long before we did and made the helicopter resound with his excited barking. We dropped lower and pursued the herd as it thundered across the tundra, all the animals tightly packed together so that they looked like a black, shaggy an-

When alarmed, the ox form a circle with babies in the middle, a sort of musk oxen castle, and it takes a brave wolf to try and get through that barricade of horns.

imated hearth rug. Before the helicopter was properly on the ground, the door had been opened. Deke leapt the few feet to the ground and sped off at full tilt in pursuit of the herd, barking loudly. When he reached them, he ran round them and the herd lumbered to a halt. It then took up the typical musk ox defensive position, all the adults in a circle facing out, shoulder to shoulder, huge horns at the ready, all the babies concealed in the centre of this protective wall of shaggy, muscular bodies. Periodically one of the old bulls would leave the circle and gallop after Deke, but Deke was too wily and fleet of foot to be caught. The oxen looked marvellously prehistoric with their great curved horns, their stocky bodies, and their long shaggy fur.

Later, when we had removed the irritant of Deke's presence and the herd had settled down, we watched them as, under a brilliant flax-blue sky, they meandered over the multi-coloured carpet of moss and flowers and tiny trees, grazing placidly, occasionally lying down to roll or doze, now and then uttering contented purring grunts to each other. It was wonderful to think that these animals, who had been brought so far had now settled down and were breeding well in their new home. But what was even more remarkable was that for one brief moment, three countries, the Soviet Union, Canada, and the United States of America, had forgotten their ideological differences and had come together to enrich the world we live in. If one could unite in this way over musk ox, surely it should be possible to use the same example of friendship in the cause of peace. The care bestowed on these quaint shaggy oxen could surely be shown for the human race.

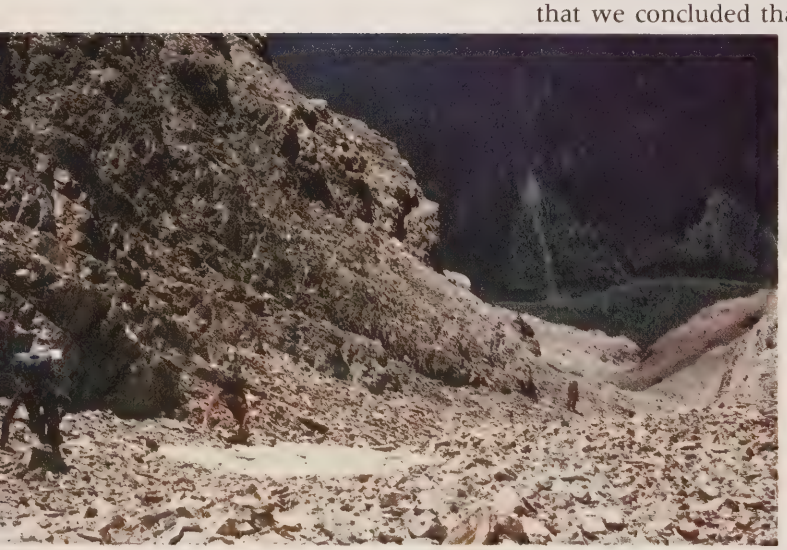
Gerald Durrell is known internationally for his work as a zoologist and for his many books, including the ever-popular My Family and Other Animals. *He is the founder of the Jersey Wildlife Preservation Trust and Zoological Garden.*

Paradise Revisited

The ROM excavation of 1983 on Mt Stephen, the first since 1930 of a new locality of Burgess-shale fossils, reveals more of the extraordinary sea life of 530 million years ago, when the greatest evolutionary explosion of all time filled the world's oceans, and almost any life form was possible .

Desmond Collins

A most unlikely series of events brought us to our excavation on Mt Stephen in 1983. First, in 1975 Parks Canada had refused us permission to excavate from the Burgess shale in Yoho National Park ("A Palaeontologist's Paradise", *Rotunda*, Winter 1978/79). Consequently, we had scoured the mountainside for loose specimens and found so many rare and unique fossils that we concluded that there must be another fossil-bearing band above the two Burgess shale quarries. Knowing the sensitivity of Parks Canada to requests to excavate, we thought that we were more likely to get permission if we first looked elsewhere in the park for significant new fossil localities. We did not have great expectations of finding any because the ground had been covered for over sixty years by distinguished geologists from the Smithsonian Institution, the Geological Survey of Canada, and from Harvard and from other universities in Wisconsin, Montana, Calgary, and Washington.



In 1981, with both written and financial support from the Geological Survey of Canada, we received permission to reconnoitre new localities in the park. To guide our search, we followed the Cathedral Escarpment, a Cambrian submarine cliff, in front of which the Burgess shale outcrops on Mt Wapta. To our great surprise, we discovered seven new localities of Burgess shale fossils in 1981, and seven more in 1982. We concluded that we had found them when our distinguished predecessors had not, because we were specifically looking for them, and because we had a better idea of where to look.

Our most important locality was discovered accidentally in 1981 when we were returning from an abortive hike to another locality on Mt Stephen. Derek Briggs, a research associate from the U.K., picked up a beautiful *Branchiocaris*, a crustaceanlike arthropod, which he had previously described from five known specimens in the Burgess shale on Mt Wapta. We traced more loose specimens upslope to their source in the rock outcrop. Surface sampling of the outcrop yielded some other very rare Burgess shale animals, including an extraordinarily well-preserved jellyfishlike form, *Fasciculus*, previously known from two specimens. It is probably a ctenophore (sea gooseberry), one of only two species known from the fossil record.

Above: Climbing a chute to the shoulder of Mt Field as we return from our first discovery in 1981
Opposite page: The seven-centimetre-long, ten-clawed "Santa Claws" was a sea-going ancestor of spiders and scorpions.

David (using the drill), Chen, Sean, and Alex, excavating the new Mt Stephen fossil site, in 1983. The campsite is in the background.

With specimens of this quality and rarity coming from Mt Stephen, it took great self-discipline to prepare the site only surficially in 1982 while awaiting inspection by the chief park warden and permission to excavate. Inspection revealed that there was no problem with the excavation, but there was with locating a campsite, because no level area could be found anywhere nearby on the mountainside. If we couldn't camp, we would be faced with a strenuous two to three hour hike up from the valley floor each day.

We were back in Field in Yoho National Park on 28 June 1983, ready to excavate the new fossil site. The preceding winter had been very busy indeed. Yoho Park officers had prepared both a geological resources management plan for the park and a site management plan for our locality. We had decided to build wooden tent platforms for our campsite. I had applied for and received funding from the Geological Survey of Canada, the National Sciences and Engineering Research Council, and Summer Canada for two summer interns. Barbara Stephen, then associate director, curatorial, of the ROM, very kindly had provided extra funds for the purchase of a portable gas-driven rock drill, which proved indispensable for our excavation since we were not allowed to use explosives. With me on the 1983 ROM expedition were Chen Jun-yuan, a palaeontologist colleague from the People's Republic of China, and Sean McFarland and Alex Nikolajevich, two geology students from the University of Toronto. We would be joined later by David Rudkin and Peter Fenton of the ROM, and by my two elder children, Kate and Matthew. Six days were needed to negotiate the final details of the site management plan, to build the 8′ × 10′ wooden platforms, to familiarize the party with Burgess shale rocks and fossils, to get supplies, and to be briefed on safety procedures in the park.

The day we had worked towards for the previous two years dawned on 5 July. We were about to excavate the first new Burgess shale fauna since Raymond's quarry was opened on Mt Wapta in 1930. It was a beautiful sunny morning. We arrived early, with all of our equipment, at the helicopter pad near the Field baseball diamond. The helicopter arrived at ten, flown by Jim Davies, regularly voted one of the best and safest helicopter pilots in North America. Eric Langshaw and Randy Robertson, our two contact wardens, were whisked up to the campsite. They had travelled in a safety harness, suspended from a rope that was hanging from the helicopter. After they were carefully lowered by the rope onto the site, the helicopter made several trips, hauling loads of tent platform frames, plywood for the floors, collecting and camping gear, food, clothes, and supplies, which the wardens unloaded. Finally we flew (inside the helicopter) to a spot below the trilobite beds, and then hiked over to the campsite along the trail flagged by Eric and Randy.

The wardens indicated where they wanted us to camp and then we dragged the platform frames over and set them up. It took most of the day to assemble the platforms and to put up the tents. We secured our supplies just before a

continued on page 37

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thunder and lightning storm blew in and pelted us with pea-sized pellets of hail. It rained, on and off, for the next three days.

In between showers we built an eating area beside the utility tent and laid out a trail across to the excavation site, where we prepared a storage site nearby for our collecting tools, and then carried them across. We couldn't do much else because in the final twist of the bureaucratic screw we were still waiting for the superintendent to sign the site management plan, and for the collecting permit to arrive from Calgary. My Chinese colleague Chen had a theory about all the bureaucratic procedures. He thought it was because Canada had so many trees and was therefore able to manufacture so much paper! We hiked out after four days to wash, rest and resupply, and wait for the permit. This sequence of four days in camp followed by one day for rest and resupply set the pattern for the season.

We finally got the permit on the afternoon of 11 July and returned to camp. On the 12th we began to excavate, at last. Progress was slow because of intermittent showers, but the rain was less of a problem than the reduced light. To see the fossils well, we needed strong light. After two days we had collected thirty specimens, but then we had to interrupt our work so that we could meet our other party members and accompany them back to the site. The night of their arrival it stormed, and mud washed out both the C.P.R. line and the Trans-Canada Highway. However, after two more days, rainy of course, we all were able to return to the camp.

On the 17th we collected our first new form, a "shrimp" with large eyes and a needle nose. Another slab had small fishlike arthropods scattered over it. Fish had yet to evolve at the time that these animals lived, so what we were finding were invertebrates with a fishlike shape, presumably because they lived the same way small schooling fish do today. By this time we had developed our procedure of circling, numbering, identifying, and recording specimens as we exposed them by splitting the rock. Part and counterpart of each specimen on opposing surfaces of the newly split layer were given the same number. When the rock was difficult to split, we fired up the gas-driven rock drill. Otherwise, we used only hammer and chisel.

By 22 July we had collected a total of one hundred and fifty specimens. However, we had just about finished excavating the known fossil-bearing layers in the first block and still had only the one new form. This scarcely justified all our effort, expense, and discomfort. Just as our outlook was becoming pessimistic, on our next return to the site, we began splitting deeper into the ledge and found fewer, but rarer species. These included another ctenophore, the onychophoran *Aysheaia*, and most important, the index trilobite *Glossopleura*, characteristic of rock layers below the Burgess shale, which indicated that our locality is significantly older than the Burgess shale.

Our prospects continued to improve. A few days later Chen found a large arthropod with a paddle tail, along with some beautifully preserved trilobites *(Naraoia)*, and three days after that I collected three specimens of a new spiny form of unknown affinities. Then came two worms and two specimens of the strange animal, *Wiwaxia*. We were beginning to accumulate quite a variety of both rare and common Burgess shale fossils, along with the new forms.

We interrupted our excavation for five days to work with a TV crew from the CBC program *The Nature of Things*. They filmed our activities, and also visited Walcott's quarry on Mt Wapta and Walcott's campsite below Mt Burgess. Luckily for them, the weather was beautiful. The film was broadcast in December 1985.

On 10 August we began splitting the basal fossiliferous layer in the biggest block and revealed a bed covered with dark blobs, some of which were the ctenophore *Fasciculus*. It may have been a shoal of ctenophores overtaken and buried by a submarine mud flow 530 million years ago. Finally, on 13 August, we exposed our most spectacular find, a segmented arthropod with a big paddle tail and five pairs of claws on its head. Since dubbed "Santa Claws", it is probably the ancestral chelicerate, that is, the progenitor of scorpions and spiders, which evolved much later. Its discovery marked the high point of the excava-

The first new species that we found in 1983 was this four-centimetre-long "shrimp" with large eyes and a needle nose.

Fasciculus (10 cm), the earliest known ctenophore (sea-gooseberry). Common in the sea today, ctenophores are almost never fossilized because of their soft jellyfishlike bodies.

tion. We went in to the excavation site three more times, and found a number of fine and rare specimens of animals, but none which were new. On 26 August we split the last fossil-bearing rock. This was fortunate, because we had arranged to fly out on the 27th. It took all that day to fly everything out and to clean up the camp and excavation sites. When all was completed, the chief warden was carried majestically past the excavation site, suspended beneath the helicopter, for a royal inspection.

On the next evening, Sunday, I spoke about our excavation and discoveries to the townspeople of Field, who had been very curious about what we were doing. Listing our specimens for inspection and packing for our departure required two days. On the last night, the two contact wardens, Eric and Randy, who had been particularly helpful to us all summer, and the park naturalists held a party in our honour. It made a fine and thoughtful end to the visit.

All things considered, it had been a very successful excavation. We had collected about seven hundred specimens, including at least five new species, three of which are from animal groups not previously found in the Stephen Formation, the overall unit of rock which includes both the Burgess shale and our new locality. One species is an animal with a previously unknown body plan. We discovered the index trilobite, *Glossopleura*, in the fauna, which showed that the fauna is slightly older than that of the Burgess shale. The two faunas have most of their animals in common, but in greatly differing proportions, and in some cases, in different sizes. Obviously, they are distinctly different faunas.

The *Glossopleura* fauna is the most significant discovery of soft-bodied fossils found in the Stephen Formation since Walcott stumbled upon and excavated the Burgess shale seventy years ago. With other faunas targeted for excavation, we have confidence that we will get an even clearer picture of the life of the Middle Cambrian seas, 530 million years ago, from a fauna described recently by the noted science writer, Stephen Jay Gould, as composed of "the world's most important fossils . . . of transcendent importance . . . for our understanding of evolution and the history of life." (*Natural History*, December 1985).

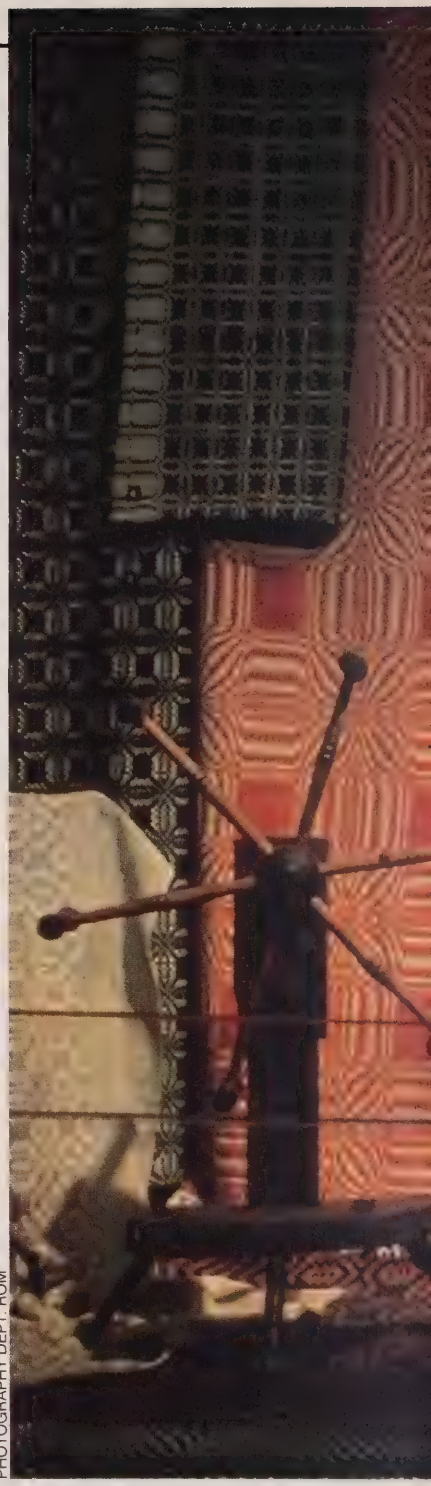
We are looking forward to going back.

Above: What is it? This new spiny animal (4 cm) with hairy legs has a body plan that has not been seen before.

Opposite page, top: The trilobite *Naraoia* (4 cm), showing its legs and gills. Yoho National Park is one of only two places in the world where trilobites showing legs are preserved. *Bottom: Plenocaris* (5 cm) a minnowlike arthropod that lived at a time before fish had evolved.

Desmond Collins joined the ROM in 1968 as curator in the Department of Invertebrate Palaeontology. Since 1975 he has led five ROM expeditions to the Burgess shale. The discovery by the ROM parties of new fossil localities and faunas of the Burgess shale type in the Stephen Formation marks a dramatic new development in research on this most important of all Canadian fossil occurrences.

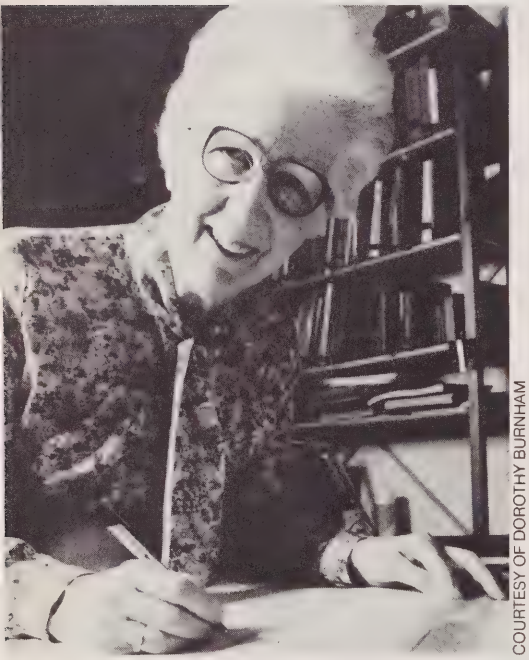
DOROTHY BURNHAM
Discovering Canada's Handwoven Heritage



PHOTOGRAPHY DEPT. ROM

Adrienne D. Hood

Forty-five years ago, a 19th-century Canadian coverlet piqued Dorothy Burnham's curiosity. Today we have a documented history of our handweaving heritage.



COURTESY OF DOROTHY BURNHAM

Dorothy Burnham, aged seventy-four, at work at her drafting table in her office at home, in the fall of 1985

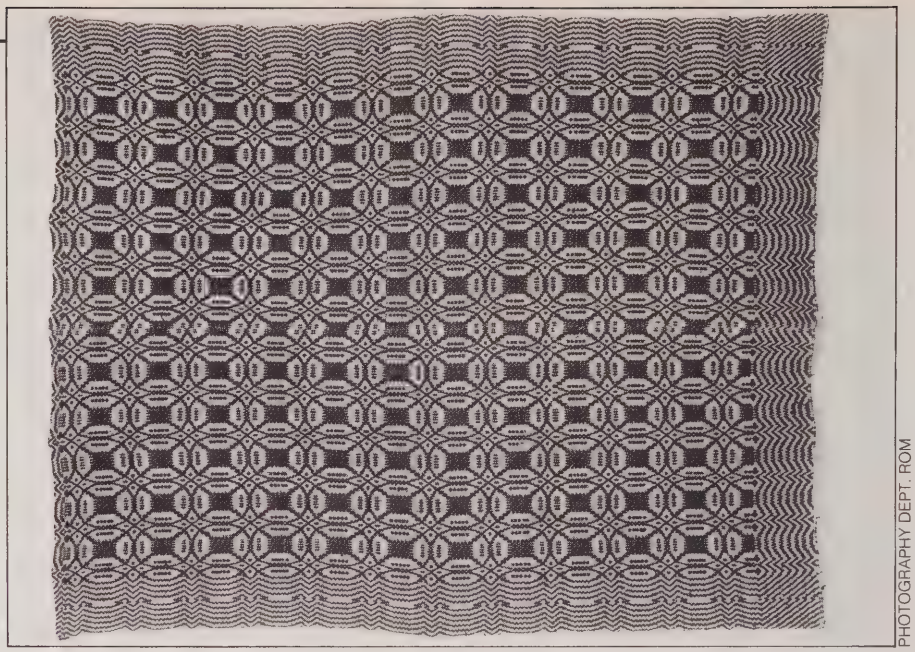
WHEN Dorothy K. Burnham, C. M., began work at the Royal Ontario Museum of Archaeology in 1929, neither she nor anyone else had any idea that there was a Canadian textile tradition. Now, after fifty-seven years of researching, collecting, exhibiting, and writing about Canada's handwoven heritage, she can barely imagine such a time.

Dorothy K. Macdonald began her career at the Museum when she was only seventeen years old. She was hired as a draftsperson to draw the artifacts in the collections for the Museum's catalogues and publications. Over the next decade she continued this work while also taking on the responsibilities of chief cataloguer. Her drafting and cataloguing work introduced her to a wide variety of museum artifacts. Dorothy became particularly interested in the costume collection, and when she could find time between her other duties she began to research the history of dress.

Gradually she was able to delegate some of her drafting tasks to others, and this gave her more free time to increase her knowledge of textiles. Since the Museum had few resources with which to support the education of its staff, Dorothy took courses on her own, in evenings and during holidays, in textile chemistry, pattern drafting, spinning, and weaving. Finally, in 1938, the textile work that Dorothy had undertaken outside of her official duties was recognized when the board of directors of the Museum recommended that she be given the title of deputy keeper of textiles.

Prior to 1941 the textile holdings of the Royal Ontario Museum of Archaeology included artifacts from many cultures: European, Chinese, Peruvian, and East Indian, to name just a few. Among all these exotic treasures, however,

Above: Display of overshot coverlets from the exhibition *Keep Me Warm One Night*, ROM, September 1971.
Left: Dorothy Burnham used this book to record information about the textiles found on the first research trips in 1947 and 1948.



PHOTOGRAPHY DEPT. ROM

This is the first coverlet to come into the ROM collections. It arrived at the Museum in 1941 as an unsolicited gift from Miss Florence Mackinnon who was closing the family farm near Hillsburgh, Wellington County, Ontario. The coverlet was woven in the area about 1840. Its arrival piqued Dorothy K. Macdonald's (Burnham's) curiosity and sparked her interest in researching Canadian handweaving. Before this time no one had suspected that Canada had a distinctive weaving tradition.

This coverlet was designed to show the borders along the sides and across the foot of the bed.

there were none of Canadian origin. This situation was to change one day in 1941 when an unsolicited gift arrived with the mail.

The gift, a blue and white bedcovering with a geometric design, was sent by Miss Florence Mackinnon of Guelph. An accompanying note stated that the donor was closing the family farmhouse near Hillsburgh, in Wellington County, Ontario, and felt that perhaps the coverlet, one of several which her grandmother had had made for each family member about 1840, should be in the Museum collection. Dorothy had never seen anything like it, and she showed it to C. T. Currelly, the director of the Museum. In an unpublished manuscript Dorothy described Currelly as beaming with delight and saying, "This is important! Coverlets like this were in all the farmhouses in southern Ontario when I was a boy . . . and I haven't seen one for years." Although Currelly thought it unlikely that more coverlets could be found, Dorothy began to think that if one had survived, perhaps others had. Even though it was to be many years before this idea could be diligently pursued, the seed for the future Canadian Textile Project had been planted.

Between 1941 and 1947 Dorothy did not actively research Canadian textiles and only a few more pieces were added to the collection. During this period, however, she took a weaving course to help her to understand how coverlets were made. The skills and knowledge which Dorothy gained proved to be invaluable during the rest of her career. In 1944 she married Harold Burnham, a banker. The following year, in anticipation of beginning a family, she invited Betty Maw (later to become Betty Brett), a former draftsperson, to join her on staff in the Textile Department. Until the fall of 1947 the two women shared the single position of keeper of textiles, which allowed Dorothy to pass on her knowledge of textiles to her successor.

In the summer of 1947 the Museum was offered a booth at the Canadian National Exhibition. Dorothy and Betty assembled several coverlets for a small exhibit that was accompanied by a large sign which read: "Has your family lived in Ontario for more than two generations? If so, maybe you can help us?" The overwhelming response produced a sheaf of completed questionnaires with many potentially valuable contacts.

After the C.N.E. closed, Harold Burnham took two weeks' holiday from the bank, borrowed his sister's car, and with Dorothy as the driver (Harold never drove) the two of them set out to pursue the leads. This was the first of many trips that the Burnhams would take to study Canada's weaving traditions. The couple travelled 2900 kilometres in Ontario, visiting such towns as Port Hope and Cobourg, as well as numerous places in Simcoe County and western Ontario. They found enough information about a variety of locally made textiles to conclude that a large-scale research project was warranted.

PHOTOGRAPHY DEPT., ROM

COURTESY OF DOROTHY BURNHAM

PHOTOGRAPHY DEPT., ROM

Above: In 1938, Dorothy K. Macdonald (Burnham), deputy keeper of textiles, examines historical costumes from the collections of the Royal Ontario Museum of Archaeology.

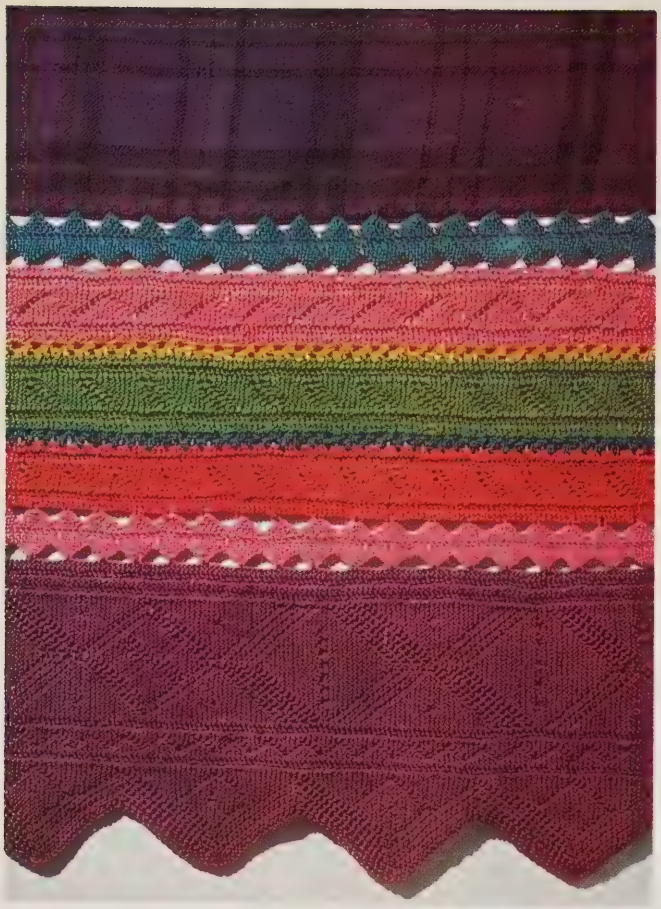
Top left: In order to help fund the early stages of the Ontario Textile Project research, Dorothy Burnham drew a paper doll that she called Roma, and a number of dresses for her that were based on costumes in the ROM collections. These were sold by the Museum and the proceeds went to the project.

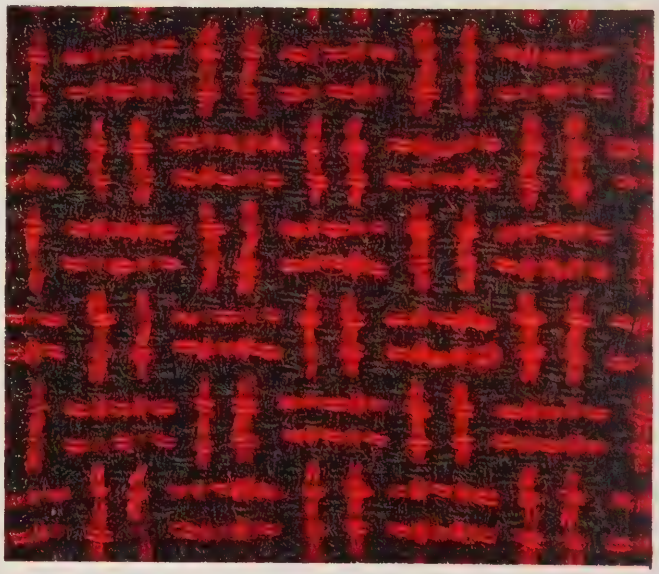
Bottom left: Dorothy Burnham holds a skein of yarn while her husband Harold winds a spool used in setting up a loom. The snapshot was taken in the old ROM Textile Department where the Burnhams were preparing the warp for the loom for the exhibition *Keep Me Warm One Night*.

The next problem was to fund the research. One of the first solutions combined Dorothy's interest in costume with her drafting skills. She drew a paper doll, which she called Roma, and several dresses based on costumes in the collection, which would fit her. The Museum printed copies of the drawings which they sold, with all profits designated for the work on the Ontario Textile Project. Additional funding came from ten textile firms, each of which pledged one hundred dollars over two years, thus enabling the Textile Department to carry out two summers of extensive research. It is interesting to look at the reports from the summer of 1949 and to see that weekly car rental cost $20.00, and that living expenses for twenty-seven days out of town amounted to only $81.26.

The Burnhams had their first child in 1948 and Dorothy's colleague Betty Maw took over the research project. Dorothy's increasing family responsibilities did not allow her to continue with her formal museum work, but Betty often dropped by the Burnham household with material collected during Ontario field trips in the summers of 1948 and 1949. She would deposit this material, which Dorothy recorded and catalogued, in the baby carriage located in the front hall.

During the 1950s the Burnhams' involvement with Canadian textiles took a new turn. Harold had learned to weave from Dorothy and in 1953 he left the bank and the family moved to Jordan, Ontario, where the two Burnhams established a weaving business. For five years they wove and sold a variety of textiles, thereby contributing their own material to Canada's handwoven heritage. Meanwhile, they informally collected and documented the rich textile traditions of the Niagara Peninsula.





PHOTOGRAPHY DEPT. ROM

Display of horse blankets woven by German Canadians, from 1971 ROM exhibition *Keep Me Warm One Night*. Because horses wearing these blankets could be in public view, such as outside a church, the blankets were often of the highest quality.

The connection with the ROM was officially resumed in 1958 when Harold Burnham joined Betty (Maw) Brett in the Textile Department. In 1964 he revived the Canadian Textile Project. A grant from the National Museums of Canada in 1965 and a senior fellowship from the Canada Council in 1966 enabled the Burnhams to extend their research beyond the borders of Ontario to include all of eastern Canada. In 1966 Harold and Dorothy, with their sons Mark and Jim, set off on a ten-thousand-mile (sixteen-thousand-kilometre), three-month trip to document the weaving traditions of Quebec and the Maritimes.

As a result of the information and artifacts that the Burnhams were able to gather on that trip, the Canadian textile collection at the ROM grew to include handwoven items from most of the older settled parts of Canada. Gradually a more complete picture of Canada's weaving tradition was emerging. Not satisfied with an examination of just the Canadian material, in 1967 Harold extended his travels abroad—accompanied by Dorothy on the Scottish segment of the trip—to explore the European origins of our early handwoven heritage.

The achievements of the Burnhams' twenty-four years of researching, documenting, and cataloguing the weaving traditions of their native land culminated on 13 September 1971 with the opening of the ROM exhibition, *Keep Me Warm One Night*—a title derived from the name of an old coverlet draft found on Cape Breton Island. In addition to organizing the exhibition, the Burnhams wrote *Keep Me Warm One Night* (now in its fifth printing), a fully illustrated history of Canadian handweaving that includes detailed weaving drafts drawn by Dorothy. In 1973, two years after the major exhibition and six months after the publication of the book, Harold Burnham died.

While Harold's death was a tragic blow for Dorothy, it did not stop her textile work. She had resumed part-time employment in the Museum's Textile Department in 1967, and after her husband's death she became once again a full-time member of the staff, this time as associate curator. After Betty Brett's retirement in 1974, Dorothy was promoted to curator, the position she held until her own retirement in 1976.

During the past fifteen years, Dorothy's numerous publications belie her advancing age. Moving away from the subject of Canadian handweaving, she has published several books including *Cut My Cote* (ROM, 1973), a book about garment construction; *Pieced Quilts of Ontario* (ROM, 1975); and *Warp and Weft: A Textile Terminology* (ROM, 1980). She has also extended her research to include the little-explored textile traditions in regions west of Ontario.

In the first year of her "retirement", Dorothy took a bus trip across western Canada where she saw textiles from such groups as the Ukrainians, Hutterites, and Doukhobors. She also was invited frequently to lecture on Canadian textiles to various groups in the United States. It became apparent to her that handmade textiles could and should be treated as an art form and that Canadians as well as Americans should be given an opportunity to learn about the great cultural diversity of Canadian textile traditions. The National Gallery of Canada agreed with Dorothy and sent her on a trip across Canada to select artifacts, rep-

Opposite page
Top left: Woven bedding cover with a knitted border, made by Canadian Doukhobors in Saskatchewan about 1910–1920. During the day it covered the folded bedding so that the bed could be used for sitting. Gift of Dorothy K. Burnham. *Top right:* Doukhobor knotted pile rug, probably made in British Columbia between 1920 and 1940. This type of rug is unique among Canadian handwoven traditions. At one time the Doukhobors lived in the Caucasus, a mountainous region whose people were rug weavers; it is likely that rugs such as this one became part of the Doukhobor weaving heritage at that time. Gift of Dorothy K. Burnham. *Centre left:* Samples of overshot coverlet patterns which were taken from old drafts found in Cape Breton, Nova Scotia. These three are from a collection of more than forty samples woven by the donor. The top one is called "England's Beauty", the middle one is from a draft inscribed "Mrs. Gillis No. 18", and the bottom one is from a draft called "Olive Leaf". Gift of Mrs Florence M. Mackley. *Centre right:* Detail of a woman's woollen shawl, woven in tabby, the simplest possible weave structure, using a pattern called log cabin. The combination and sequence of colours make the design truly elegant. The shawl was woven at Perth, Ontario, during the last quarter of the 19th century. Gift of Mrs. J.H. Stewart. *Bottom:* Tapestry-woven wall-hanging made in the Ukrainian tradition in Saskatchewan, about 1930. On festive occasions it was hung horizontally along a wall just below the ceiling. Gift of Dorothy K. Burnham.

COURTESY OF DOROTHY BURNHAM

Governor General Jeanne Sauvé presenting the medal of the Order of Canada to Dorothy Burnham.

Adrienne Hood is a curatorial fellow in the Textile Department, ROM. She is presently completing her Ph.D. dissertation on 18th-century textile manufacture in Pennsylvania for the University of California in San Diego.

The exhibition Discovering Canada's Handwoven Heritage *will be on display at the Canadiana Building of the Royal Ontario Museum from 24 May 1986 until 11 January 1987.*

resenting as many weaving traditions as possible, for inclusion in a travelling exhibition. *The Comfortable Arts*, accompanied by a catalogue of the same name, opened at the National Gallery in Ottawa in the fall of 1981. This show travelled to several Canadian cities and introduced a great number of people to Canada's handwoven heritage.

Dorothy regards *The Comfortable Arts* as one of the major accomplishments of her career, for it was the first time that she had been able to present a truly comprehensive look at Canadian weaving traditions, which also included work by the native peoples. Given the breadth of her work on Canadian textiles and her lifelong devotion to the subject, it was not surprising that in the spring of 1985 this remarkable woman was made a member of the Order of Canada.

Although she is nearly seventy-five years old, Dorothy shows little sign of slowing down. Her book about the unusual and colourful Doukhobor handwoven fabrics, published by the Royal Ontario Museum, will be available this spring. Entitled *Unlike the Lilies: Doukhobor Textile Traditions in Canada*, it illustrates not only the textiles but also the methods and tools used for their manufacture. She has recently resumed her ethnological work involving research on early skin coats worn by the Naskapi Indians. In addition to these activities, Dorothy will be the keynote speaker at "Convergence", the biennial meeting of the Handweavers' Guild of America, which will take place in Toronto this summer. For her talk she will use a high-tech media presentation to illustrate old textile traditions.

Her acceptance into the Order of Canada and her participation at "Convergence" are symbolic of the broad and well-deserved recognition that Dorothy K. Burnham has received for being the person who first suspected, then proved, that Canada has its own distinctive handweaving tradition.

Unlike the Lilies

DOUKHOBOR TEXTILE TRADITIONS IN CANADA

Dorothy K. Burnham

112 pages, ill. b&w and colour, ISBN 0-88854-322-0, $24.95 paper.

This spring the Royal Ontario Museum will release a new publication by Dorothy K. Burnham, internationally acclaimed textile curator, fibre historian, and a foremost authority on Canada's handwoven heritage.

This profusely illustrated work contains the author's research on the previously undocumented textile traditions of the Russian Doukhobors, one of the last groups to pioneer in the Canadian West. The author presents firsthand information on the unusual and colourful handwoven fabrics of the Doukhobors at a time when the generations who possess this knowledge have almost vanished. More than 180 photographs, 24 in full-colour, of textile examples and implements are accompanied by descriptions of the methods used in the preparation of yarns, the types of spinning wheels, the looms, the various weaving techniques, the unique costumes, and the great variety of household goods, including pile rugs.

Please add the following for postage and handling: Canada—10%, USA—12%, overseas—15%.

ROM

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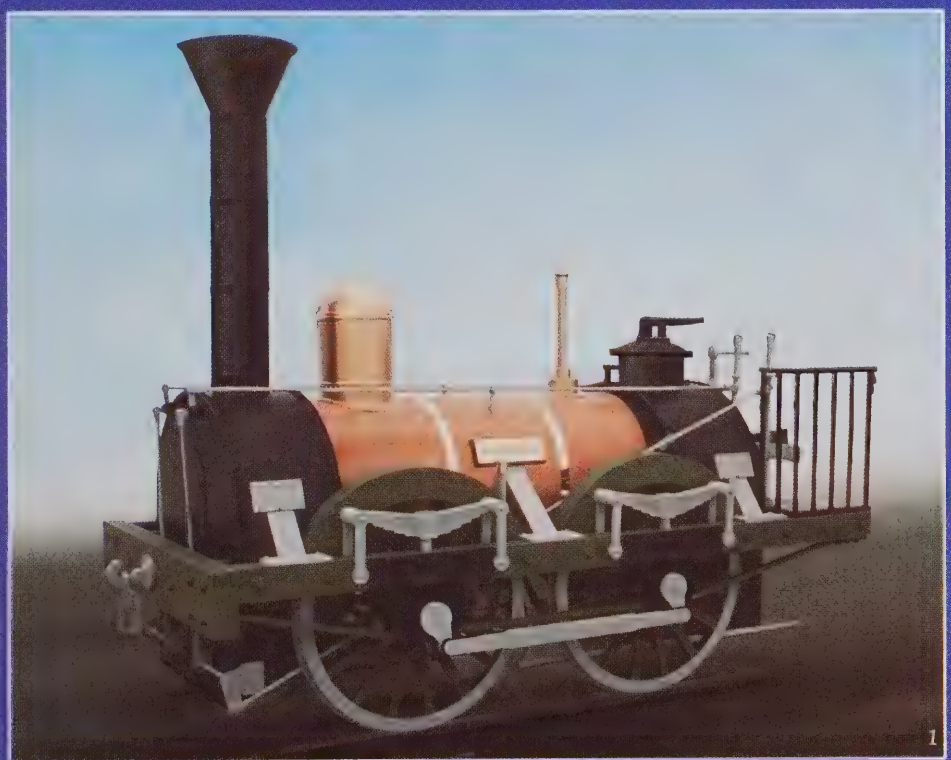
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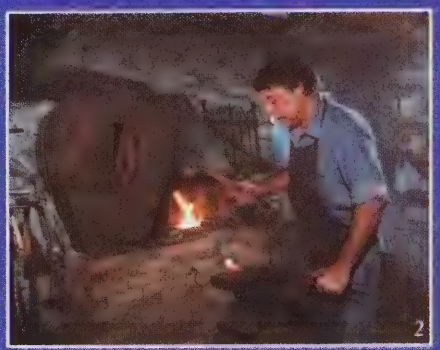
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1-The Dorchester was Canada's first locomotive. 2-Recreating the first spike at Laprairie, Québec 3-Detail from Strathcona Park by W.J. Phillips – VIA Rail collection

Across Canada and at EXPO 86, VIA Rail invites Canadians to take part in the sesquicentennial of passenger rail. See the murals from a great Canadian train at the McMichael Canadian Collection at Kleinburg, Ontario from June 22 to August 17 or at the Vancouver Art Gallery from September 12 to November 16, 1986. Come to Saint-Jean-sur-Richelieu, Québec, the site of the first Canadian train trip for festivities July 19. Visit our Expo 86 exhibit at the Vancouver station all summer.

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One Hundred and Fifty Years of Riding the Rails

In our era of space exploration and telecommunications it may be hard to believe that the first public railway in Canada was opened only one hundred and fifty years ago.

Omer Lavallée

THE Champlain & St Lawrence Rail-Road, Canada's first public, locomotive-operated railway, was opened for service just one hundred and fifty years ago, in July 1836. Connecting St John's and Laprairie, Lower Canada, the railway, like other early railways in North America, was built as an adjunct to an existing and comprehensive system of steamboat services, which connected principal centres of population, situated on the coasts or on the navigable rivers that penetrated the heart of the continent.

Steam navigation had come early to North America, and it rapidly gained in popularity as an alternative to overland shipping and travel. The popularity of steamships was responsible for retarding the first attempts to build an independent railway network in this country.

Steamships were first introduced into the United States in 1807, and John Molson built the first steamship in British North America in 1809. By the 1830s, dozens of steam vessels were in use in Canada. They offered the traveller reliable transportation in comfortable facilities—a welcome alternative to stagecoach travel, which at the best of times could only be described as wretched. The commitment to river travel became entrenched with the investment of millions of dollars for the improvement of waterways, which included the construction of canals and lock systems. The Lachine and Welland canals, two of the most important systems, were opened in 1825 and 1829 respectively. By the time that Upper and Lower Canada were united into the Province of Canada in 1841, the public debt for canals was more than one hundred dollars per capita, an enormous sum for the time. Nonetheless, these improvements allowed steamboats to remain practical for most commercial transport in Canada until the mid-19th century.

Canada's first public railway was designed as a portage route in a chain of steamboat services linking Montreal with New York and other great American coastal cities. It was conceived in a flurry of enthusiasm brought about by detailed accounts in Montreal newspapers of the 1830 opening of England's Liverpool & Manchester Railway, the world's first public railway to be operated exclusively with steam locomotives. Railways had been in private industrial use in British North America for more than a decade before 1836, using horses or stationary steam engines as motive power. The development of a public railway was an exciting venture.

The enthusiasm was such that a group of Montreal businessmen resolved to form a private, equity-financed company to build a railway between St John's and a point on the St Lawrence River opposite Montreal, a distance of about

COURTESY OF CANADIAN PACIFIC

The opening of the Champlain & St Lawrence Rail-Road, painted by Sherriff-Scott to mark the centenary. Collection of the Royal Bank of Canada.

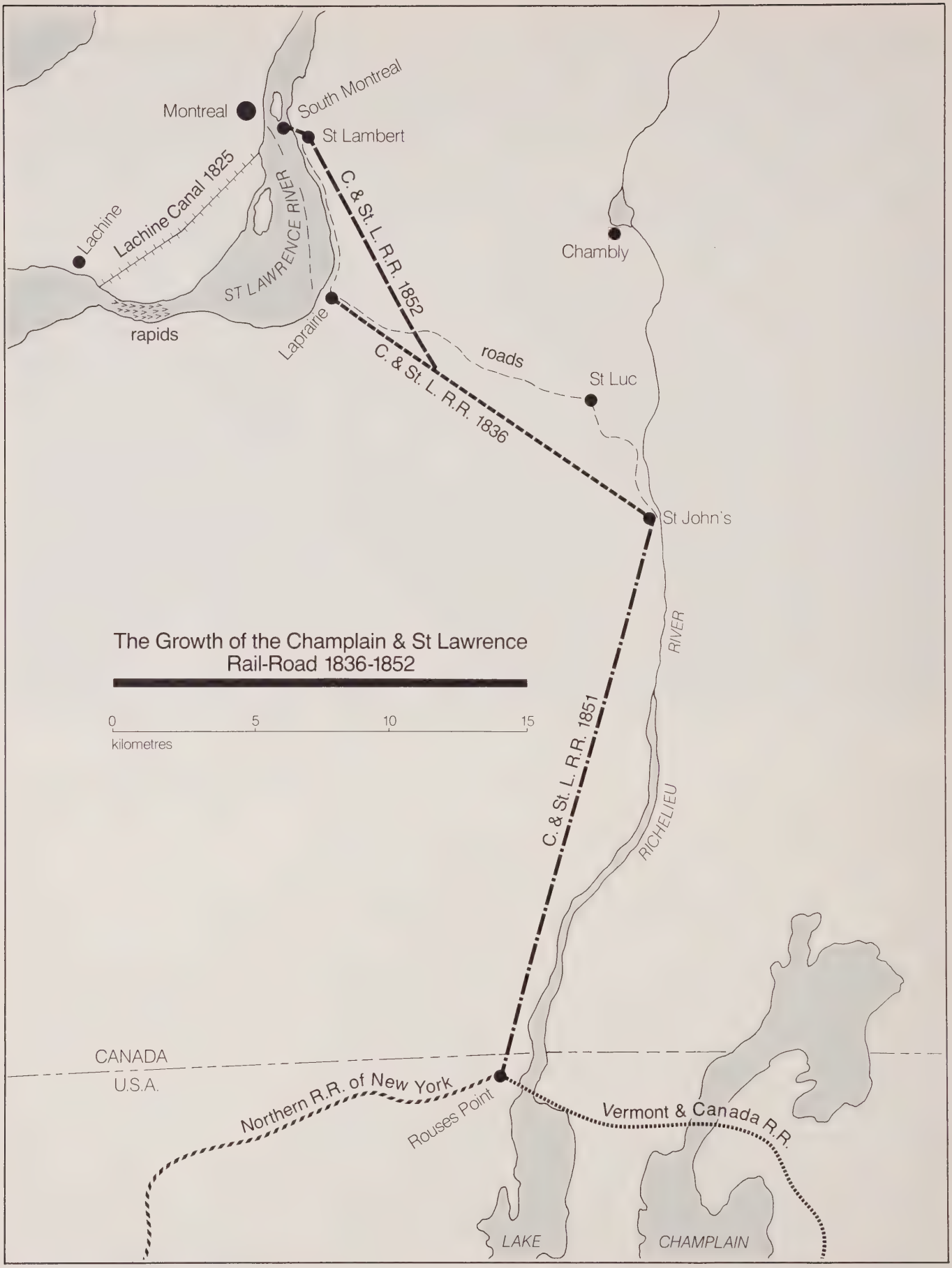
twenty-seven kilometres. The railway was to run nearly parallel to one of the busiest roads in Lower Canada, the old post road between St John's and Laprairie, thereby strengthening one of the critical links of the important Montreal-New York route.

In February 1831, an application was made to the legislative assembly of Lower Canada for a charter to build the railway. There was heated opposition in the assembly from persons associated with a rival project to build a canal around the Chambly Rapids. However, after much talk and many delays, the parliament of Lower Canada passed a bill to incorporate "The Company of the Proprietors of the Champlain & St Lawrence Rail-Road"; the bill was given royal assent on 25 February 1832.

Seventy-four incorporators were listed in the act, known officially as 2 William IV, Chapter 58. Included were names such as McGill, Molson, Torrance, Logan, Brewster, and Brush, representatives of the very cream of Montreal's merchants, bankers, and industrialists. A self-appointed committee, chaired by Horatio Gates, was formed to sell 1000 shares of the company for £50 each.

The response was disappointing. According to some historians the great success of steamboats left little reason for either interest or confidence in railways. Other historians attribute the indifference to the fact that the incorporating act limited profits to twelve percent. In those adventurous times, new enterprises often managed to return a shareholder's full capital investment through dividends issued during the first few years of operation.

The project suffered another serious blow when Horatio Gates died in the cholera epidemic of 1833. The 1832 charter had provided that the line should be surveyed by February 1833 and completed by February 1835. In 1833 these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South Montreal
St Lambert
Lachine
Lachine Canal 1825
ST LAWRENCE RIVER
C. & St. L.R.R. 1852
Chambly
rapids
Laprairie
roads
C. & St. L. R.R. 1836
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The Growth of the Champlain & St Lawrence Rail-Road 1836-1852
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RIVER
C. & St. L.R.R. 1851
RICHELIEU
CANADA
U.S.A.
Northern R.R. of New York
Rouses Point
Vermont & Canada R.R.
LAKE
CHAMPLAIN

provisions were changed, and the deadlines were extended to December 1834 and February 1837, respectively.

In October 1834, only a few weeks before the deadline for depositing the route plan, the project was saved by one of its incorporators, American-born Jason C. Peirce. Peirce was a prominent merchant and ship owner in St John's, Lower Canada, who was engaged in forwarding shipments of goods between Montreal and the United States. It was clear to him that his own interests would suffer if the charter was allowed to lapse.

At his own expense Peirce hired William Casey, an American-born engineer to make the necessary survey as quickly as possible. Late in November, the company was formally organized with Peter McGill as chairman of the board and John E. Mills as deputy chairman. Jason C. Peirce was made a director and he proved to be the company's most persistent and energetic promoter for the remaining seventeen years of his life. The board gave its approval to Casey's survey and it was presented to the legislature exactly on the deadline.

This sudden action stimulated Montreal merchants to purchase shares in the Champlain & St Lawrence Rail-Road. Early in 1835, the shareholders met and decided to proceed immediately with construction. Casey was appointed chief engineer and W.D. Lindsay of St John's was appointed commissioner (manager) of the company.

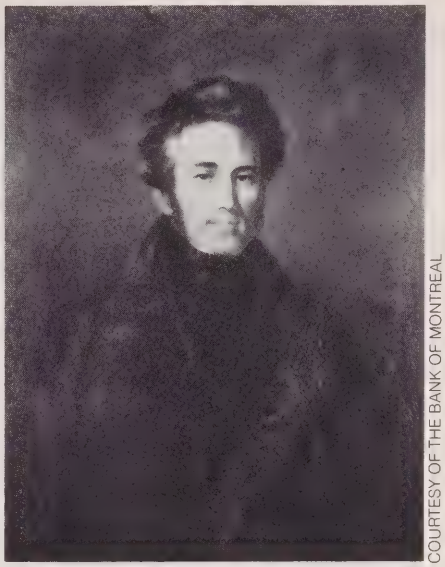
Faced with a choice of technologies, the board decided to adopt the less expensive American method of laying track made of wooden stringers, and crossties that were topped with iron strap rail. In Britain railways were already being constructed of iron rail mounted in metal "chairs" bolted to wooden crossties. The C. & St. L. directors felt that the wooden track could be replaced with more permanent materials after the railway's economic viability had been proven. During 1835, the right-of-way was purchased, cleared, and fenced, and the roadbed formation, including cuttings and fills, was constructed. The route of the twenty-three-kilometre line (four kilometres shorter than the post road) was virtually straight, with a slight reverse curve at the middle of the route where it climbed the Côte de la Bataille, and another slight curve where it entered St John's. A bridge was built over the Little Montreal River.

Another step taken in the year 1835 was the purchase of a suitable steamboat to ferry passengers between Laprairie and Montreal. The *Princess Victoria*, fifty-two metres long and six metres wide, was launched in Montreal on 12 May 1836 by Mrs Peter McGill, the wife of the chairman of the railway company.

The acquisition of suitable motive power and rolling stock was summed up in a report from the railway's committee of management to its shareholders dated 9 May 1835:

> Contracts were entered into with Messrs Wards, early in the winter, for the completing of twelve freight cars and the castings for eight others, together with a variety of castings of iron work for turnouts, splicing plates, etc., all of which are rapidly progressing; the splicing plates being completed and in a great measure distributed along the line.
>
> A locomotive ordered in September last and made by Stephenson, who ranks among the first in this department of engineering, was to be shipped, say our correspondents, about the end of March and may be expected among the first vessels; . . .
>
> The superior style in which passenger cars are got up in the city of Troy, in the United States, together with inexperience of the mechanics in this city in the construction of such carriages, induced the Committee to send the Engineer of the Company, Mr Casey, to Troy in January last, who entered into contracts with Messrs Eaton and Robinson for two, twenty-four passenger cars, and with Messrs Eaton and Gilbert for two, sixteen ditto, complete for the road. . . .

While there are no reliable accounts of the appearance of the passenger cars, it is thought that they resembled similar vehicles built by the same firms for the Rensselaer & Saratoga railroad in the previous year. These were two- or three-compartmented vehicles mounted on leaf springs on four-wheeled, short wheelbased running gear. More is known about the locomotive. Weighing approximately 5.5 tonnes and therefore small for its time, it was the 127th locomotive built by Robert Stephenson & Co., of Newcastle-on-Tyne, England; following one of that builder's standard designs, it was a production locomotive in



COURTESY OF THE BANK OF MONTREAL

Portrait of Peter McGill, the first chairman of the board of directors of the Champlain & St Lawrence Rail-Road. He also was the first chairman of the board of the Bank of Montreal. Collection of the Bank of Montreal.

BILL ROBERTSON

Model of the *Dorchester* in the collection of the Ontario Science Centre, Toronto

every sense. The passenger cars were sent by boat to St John's and were delivered sometime in June. The Stephenson locomotive arrived about the same time.

The first reference to the presence of the steam locomotive appears in a journal kept by the Gilchristiana, a Pickwick-style social club which seems to have been composed of fashionable and well-to-do young men. The entry for 26 June 1836 tells how the group crossed the river in a so-called war canoe (a large but light freight canoe of native Indian pattern) and then travelled by four-horse carriage to Laprairie. Evidently the club had made arrangements for a horse-drawn excursion trip over the as yet uncompleted railway.

> Horses by this time yoked to the pleasure and baggage cars. Mounted the latter, said to be the easiest in its motion. Seated ourselves on stools. Kept in countenance by the Messrs Pierce (sic). The older the projector and principal promoter of the railroad, the other superintendent and agent on it. Had the best of the fun. All the grog in our locker. Had the pleasure of drinking to the health of our camarados on the other car, when they were dry. The line of the railway well built and finished, the route extremely agreeable. . . .

In contrast, a rather ominous reference appeared in the Quebec *Gazette* of 13 July 1836: "An accident has happened to the locomotive for the railroad. The fireman let the water out of the boiler and kept the fire going until the flues were burnt. She will need new ones before she can proceed."

This incident presented the company's officers with a dilemma. There was not enough time to obtain new tubes and repair the boiler properly before the scheduled day of opening, less than two weeks away. The alternative was to plug the defective tubes, thereby reducing the boiler's capacity to generate steam and limiting the locomotive's power. Fortunately these emergency measures were adequate.

Opening day, Thursday, 21 July 1836, dawned bright and clear. By mid-morning the *Princess Victoria* was under way from Montreal to Laprairie, having on board a distinguished assemblage of citizens led by Sir Archibald Acheson, second earl of Gosford, the governor in chief of British North America. Peter McGill was present as were a number of members of the legislative council and the house of assembly, including Louis-Joseph Papineau, one of the future leaders of the 1837 Rebellion. The passengers were entertained by the band of the 32nd Regiment who, in the words of the Montreal *Morning Courier*, "enlivened the company with their superior excellence in the performance of many admired overtures. The distance between the ports was run by this queen of boats, with her numerous passengers, . . . in fifty minutes."

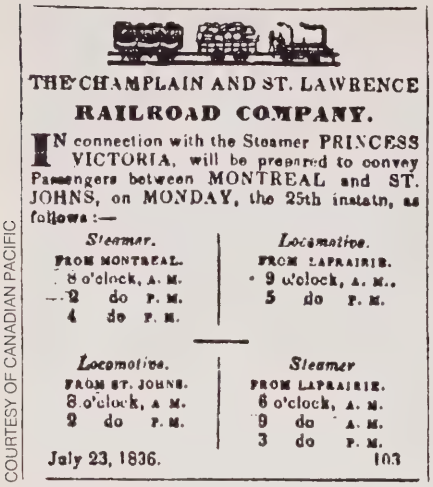
Faced with this group of prestigious passengers, the railway's officers wanted to avoid any risk of a breakdown en route. According to an account in the Montreal *Morning Courier* of 23 July 1836: "Before starting, the locomotive engine made two short trial trips with its tender, and as the accident which occurred lately to it had not been thoroughly repaired, it was deemed advisable to attach to it only two of the covered passenger cars, all of which were very comfortably fitted up and elegantly painted outside; while the other cars with the rest of the company, were drawn each by two horses."

The locomotive rose to the occasion nobly and the story continued on to say that:

. . . it soon shot far ahead of the other cars, which passed along the road just as fast as the nags, which were none of the fleetest, could drag them. The motion was easy and elicited

In the 1880s the Grand Trunk Railway was routed through a magnificent tunnel constructed of hand-cut Queenston limestone blocks. The tunnel, 195 metres long and over 5 metres high, is separated from the water of the Welland Canal's Lock Eighteen by less than one metre of earth. Water still flows over the tunnel, which is no longer in use.

PUBLIC ARCHIVES OF CANADA



THE CHAMPLAIN AND ST. LAWRENCE
RAILROAD COMPANY.

IN connection with the Steamer PRINCESS VICTORIA, will be prepared to convey Passengers between MONTREAL and ST. JOHNS, on MONDAY, the 25th instatn, as follows:—

Steamer. FROM MONTREAL.	*Locomotive.* FROM LAPRAIRIE.
8 o'clock, A. M.	9 o'clock, A. M.
2 do P. M.	5 do P. M.
4 do P. M.	

Locomotive. FROM ST. JOHNS.	*Steamer* FROM LAPRAIRIE.
8 o'clock, A. M.	6 o'clock, A. M.
2 do P. M.	9 do A. M.
	3 do P. M.

July 23, 1836. 103

COURTESY OF CANADIAN PACIFIC

Advertisement listing Canada's first railway timetable that appeared in Montreal newspapers in July 1836

from many, comparison far from favourable to the usual comforts of travelling by the stage road. In less than two hours from starting all the company had arrived in St Johns in good time and in excellent mood for the cold collation in the Railroad Station House, which was pleasantly cool and decorated with green branches.

After partaking liberally of the food, accompanied by "sparkling champagne and Madeira", the crowd enthusiastically participated in toasts to the king, the president of the United States, and the earl of Gosford. Mr Lindsay, the railroad's commissioner, presented a gold medal to engineer Casey, who was then toasted by the earl.

Two hours later, the guests prepared to return to Laprairie. Because of the flawless performance of the locomotive on the eastbound trip all four passenger cars were attached to the locomotive on the return journey, which lasted fifty-nine minutes. Regular services were inaugurated on Monday, 25 July 1836, with the locomotive-hauled train making two eastbound trips a day, leaving St John's at 8:00 a.m. and 2:00 p.m., and returning from Laprairie at 9:00 a.m. and 5:00 p.m.

A week or so later, the locomotive was withdrawn from service so that the burned tubes could be replaced. The passenger cars were hauled by horses during this interval and the Champlain & St Lawrence Rail-Road informed the public that they were not prepared to carry freight. On 9 August 1836 the work on the locomotive was completed and full service resumed.

Unfortunately, there were still problems. Two members of the Gilchristiana group, Messrs Moringhar and Macrimmon, visited the completed railway in mid-August and made a round trip over the line:

> Arrived at Laprairie and had to wait some time the return of the locomotive and cars from St John's. At last they were seen approaching and a desire to view the whole in rapid motion, led us forward a short distance on the road to meet them.
>
> Whirr, whirr, puff, puff—by they rushed with almost stunning impetuosity and lightning speed. The cars are of rather elegant construction and tastefully painted: on each, the emblazonry and armorial bearings of Great Britain and the United States, emblematical, we presume, of the connection of British and American interest and enterprise, combined together in the completion of a work so much required and so important as this is. . . .
>
> When we were on the point of starting for St John's part of the machinery of the locomotive gave way. . . . The engineer, however, after some trouble, was enabled to put the engine into such a state as to put it in our power to proceed and accordingly we got started, between four and five o'clock. We had not got more than a mile over the road, when the deplorable concern gave way again. Another half hour sufficed to get us into condition a second time to go forward and rattling along in very good style indeed.

This and other incidents point more to unfamiliarity with railway locomotives on the part of supervisors and staff rather than to any inherent fault in the design of the engine itself.

Rail traffic, during the 1836 season, met all expectations and so it was consid-

COURTESY OF CANADIAN PACIFIC

One of the nameplates of the *Dorchester*, 65 cm long, collection of the Joliette Museum, Joliette, Quebec

PHOTOGRAPHY DEPT. ROM

Scrip from the Champlain & St Lawrence Rail-Road, redeemable in three different currencies, collection of the Royal Ontario Museum

ered prudent to acquire a second locomotive to serve as a back-up. William Casey travelled to the United States early in 1837. While there he contracted William Norris of Philadelphia to supply one of his standard locomotives, a much larger unit than the locomotive already owned by the C. & St. L.

With two locomotives on the property, the company decided that it was necessary to distinguish between them, and at a subsequent date the British locomotive was named *Dorchester*, the old garrison-era name for St John's. The new locomotive was named after Jason C. Peirce. The company kept the *Dorchester* until 1849 when it was sold to another railway at Lanoraie, northeast of Montreal. In 1873, it was sold, once again, to a sawmill in St-Ambroise-de-Kilkenny, near Joliette, Quebec. After being sold in 1850, the *Jason C. Pierce* passed through many corporate hands and was still in operating condition when last heard of late in the 1880s.

The Champlain & St Lawrence Rail-Road remained Canada's only public, locomotive-operated railway until late in the 1840s, when the first glimmerings of a comprehensive role for railways began to emerge in this country. It exchanged its strap-iron rails for conventional iron ones of "T" pattern between 1846 and 1848, but retained its seasonal, steamboat-dependent operating schedule until 1851. In that year, a thirty-seven-kilometre extension was opened from St John's to Rouses Point, New York, where it connected with the American railroad network to the Atlantic Coast. Water connections were no longer needed. The ferry trip between Laprairie and Montreal was shortened to a few hundred metres when the western end of the line was diverted to St Lambert in January 1852.

The first revenue freight train to use the new Rouses Point extension passed over the line on 4 September 1851. Two days later, at the respectable age of 73, Jason C. Peirce passed away in St John's. In an obituary, the Montreal *Gazette* said of him, ". . . He was universally respected for the integrity and simplicity of his character, as well as for the performance of all of the social duties of life."

With the end of the water connections, shipping to and from Montreal was no longer impeded by the annual freeze-up of the St Lawrence River. Within a few years, railway connections through to Portland (1853), Quebec (1854), Ottawa and Brockville (1855), and Toronto (1856) further consolidated the independent railway systems. The railway hurled a last defiant gesture at the great river with the completion, in 1859, of the Victoria Tubular Bridge, between Montreal and St Lambert. This structure, the first to span the St Lawrence system between Niagara and the Atlantic Ocean, was long considered to be one of the wonders of the engineering world, and was a key link in the growing Canadian railway network which, by the end of 1860, would stretch from Sarnia, Ontario to Rivière-du-Loup, Québec, a distance of 1270 kilometres.

One hundred and fifty years after the Champlain & St Lawrence's opening there are new and competitive forms of transportation such as highways, air and space travel. All of these methods of transportation were unknown to Jason C. Peirce and his associates and yet, when economy is considered, the railway remains the quintessential means of transporting great quantities of freight over land.

Omer Lavallée is corporate historian and archivist for Canadian Pacific.

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ROM, A.D. Tushingham, 528 pp., ill. book (paper) with 39 unbound sheets of maps, plans, and sections, in box. $145.00

ISBN 0-88854-317-4

The author directed the Armenian Garden excavations in the Old City of Jerusalem as part of the international expedition from 1961 to 1967. The results clarify the archaeological history of the Western Hill. The final report on the excavation of the "Third Wall", and studies of fine ceramic wares and pre-exilic and later weights are included. This publication adds substantially to our knowledge of the city's history and culture over 2500 years. The book is illustrated with 182 plates, 91 figures, 2 maps, 21 plans, and 84 sections and elevations.

Subarctic Saga: The de Troyes Expedition

ROM, W.A. Kenyon, 40 pp., ill. $3.50

ISBN 0-88854-318-2

This booklet commemorates the 300th anniversary of the Pierre de Troyes expedition. De Troyes led an untrained force of 30 French soldiers and 70 French-Canadian voyageurs to capture the English fur-trading posts on James Bay. The French left Montreal on 30 March 1686 and by 26 July they had taken Moose Factory, Rupert House, and Fort Albany, losing only three men during the entire operation. The author recounts in vivid detail the hardships, strategies, and manoeuvres of this spectacular expedition. Illustrated with 16 photographs and a map of the journey.

Unlike the Lilies: Doukhobor Textile Traditions in Canada

ROM, Dorothy K. Burnham, 112 pages, ill. b&w and colour, $24.95

ISBN 0-88854-322-0

This profusely illustrated work contains the author's research on the previously undocumented textile traditions of the Russian Doukhobors, one of the last groups to pioneer in the Canadian West. The author presents firsthand information about the unusual and colourful handwoven fabrics of the Doukhobors at a time when the generations who possess this knowledge have almost vanished. More than 180 photographs, 24 in full-colour, of textile examples and implements are accompanied by descriptions of the methods used in the preparation of yarns, the types of spinning wheels, the looms, the various weaving techniques, the unique costumes, and the great variety of household goods, including pile rugs.

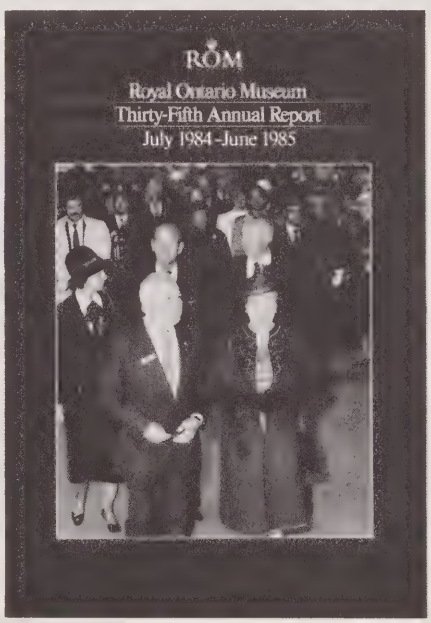
Review of the Gobioid Fishes of the Chagos Archipelago, Central Indian Ocean

ROM Life Sciences Contribution 142, Richard Winterbottom and Alan R. Emery, 88 pp., ill. $15.00

ISBN 0-88854-320-4

Royal Ontario Museum Thirty-Fifth Annual Report (1984–85)

Museum members who wish to obtain a copy of the Thirty-Fifth Annual Report (1984–85) can do so by contacting Membership Services (586-5699.)



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Some Ways that Reptiles Defend Themselves

MICHAEL GILLAM

The thorny devil *(Moloch horridus)* is protected by a colour pattern good for camouflage as well as by spines on its back, head, sides, and legs, which make it look very dangerous to predators.

BILL ROBERTSON

The colour pattern of the death adder *(Acanthophis Pyrrhus)* helps to obscure the outline of the snake.

BILL ROBERTSON

The colour pattern of the gecko *(Heteronotia binoei)* allows it to blend into its rocky habitat.

Reptiles, like all animals, have ways to avoid being eaten. Perhaps two of the most common ways are fleeing and hiding. Fleeing requires agility, and many kinds of reptiles can move very quickly and nimbly. To hide, the reptiles may burrow or wriggle under or behind plants or rocks, or like some other animals, they can take advantage of camouflage. Animals that use camouflage are coloured so that they seem to blend in with the surroundings where they normally live. This makes it very difficult to see them. Therefore predators, animals who may wish to eat the camouflaged animals, have difficulty finding them.

Often the body colour of a reptile is the same colour as the soil, bark, or rock upon which it is lying or standing. However, the reptile also may have a colour pattern that does more to hide it. The pattern can make it difficult for a predator to see clearly the form of the reptile and so a successful attack is not too easy. If a reptile were in a place where it normally would not be found, its colour pattern might make it very noticeable to his enemies. Yet even a brightly coloured reptile or other animal will be well camouflaged if it is in its usual setting and if it remains very still.

On a recent trip to Alice Springs, which is situated in central Australia, some staff members of the Museum had several opportunities to observe reptiles that were using camouflage to hide. The soil and rock in the region are red, and many central Australian reptile species are a reddish colour, which allows them to blend into the habitat. Many of the reptiles have colour patterns which make it difficult to see the real shapes of their bodies when they are still.

The slow-moving thorny devil (*Moloch horridus*) cannot escape from its predators by fleeing. Instead this animal is protected by a good colour pattern for camouflage as well as by spines on its back, head, sides, and legs, which make it look very dangerous to the snakes and birds who may want to eat it.

A more dramatic way for some reptiles to defend themselves is by dropping their tails. Although not all reptiles can do this, many lizards as well as some snakes can. If the reptile's tail is grabbed by a predator, the tail breaks away easily at the base and the animal can escape, leaving its tail behind. The muscles

FOR THE YOUNGER READER

in the broken tail make it wriggle for a few minutes after the break takes place. Before the predator realizes that it only has a wriggling tail and not a whole reptile in its mouth, the tail-less reptile has escaped. The blood vessels in the base of the tail close after the break so that the reptile loses very little blood.

In time, the tail-less reptile will grow a new tail but this tail will not have new bones. A rod of softer gristly tissue, called cartilage, forms the centre of the new tail. (The cartilage is much like the tissue that supports our outer ears.) The scale and colour patterns of the new tail may be different from those of the old tail. Tails may be lost and replaced by new ones many times.

Camouflage and tail loss are two good ways for reptiles to defend themselves against predators. In Canada, polar bears and other white arctic animals are some of the creatures that successfully use camouflage. Skinks are the only Canadian reptiles that can lose their tails when attacked.

We can learn much from watching animals and sometimes, in certain ways, we behave as they do. For example, when people play hide-and-seek, those who are hiding remain still to avoid being found. You may have more in common with reptiles and other animals than you previously thought.

ROSS MacCULLOCH

Calling Young Writers

Children between the ages of 9 and 14 years, who wish to submit short articles or poems about an experience at the Museum, may send their articles to *Rotunda*, Publication Services, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6. No submission will be returned unless it is accompanied by a stamped, self-addressed envelope.

Storm Child
Brenda Bellingham
James Lorimer and Company
124 pp. $5.95 (paper)
$12.95 (cloth)

Isobel Macpherson is the twelve-year-old daughter of a Scottish fur trader and a Peigan Indian in the 1830s. When her father decides to return home to Scotland and "turn off" his country family, leaving them in the hands of another Hudson's Bay trader, Isobel asserts her independence by choosing to live with her Peigan grandparents in the shadow of the Rockies.

Yet even though she has refused to submit to the conventions of the fur company's relationships with the Indians of the time, Isobel finds that her choice is not so easily adhered to. She is torn between the claims of Jamey Jock Bird, who has adopted the Peigan way of life of his mother, and Henry Rowand, Isobel's childhood friend with whom she has shared much of her life.

The dilemma of Isobel's life is presented by the author with a lot of sensitivity, which makes *Storm Child* one of the most readable books of the season.

Recommended for grades six to eight

Looking at Plants
David Suzuki with Barbara Hehner
Stoddart
96 pp. $8.95 (paper)

Did you know that:

- observation of the methods used by wasps to build their nests led a French scientist to suggest ways of making paper from wood-pulp?
- a child weighing twenty-three kilograms can sit on the leaf of the royal waterlily from Brazil?
- the largest flower in the world has a perfume which gives off a smell of rotting meat?
- seeds from the wild cucumber hurtle through the air at speeds of up to one hundred kilometres per hour?
- someone cut down the oldest tree in the world with a chainsaw to find out its age (4900 years)?

These wonderful nuggets occur in the first in a series of six books by David Suzuki. Not only does *Looking at Plants* provide much information to fascinate children; it also describes dozens of experiments with plants which children will thoroughly enjoy. It's a fine addition to the growing number of science-oriented books aimed at children under ten.

Recommended for grades four to six

Reviews reprinted from The Children's Book News *courtesy of The Children's Book Centre, Toronto*

A Few of my Favourite Rings

ANKER ODUM

1. It's easier to juggle rings than to juggle clubs or even balls. Why is that? And, what is the greatest number of rings ever juggled at one time by one person?

2. Saturn's rings are the most famous rings in space, but the planets Uranus, Jupiter, and Neptune have rings too. There is no earthly ring today, but has there been one, or will there be one, or both?

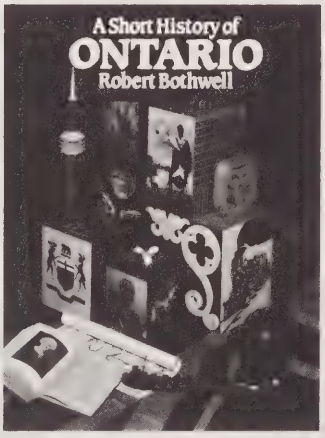
3. One of the most remarkable natural rings is the "fairy ring" of certain mushrooms. Why do these mushrooms grow in a ring?

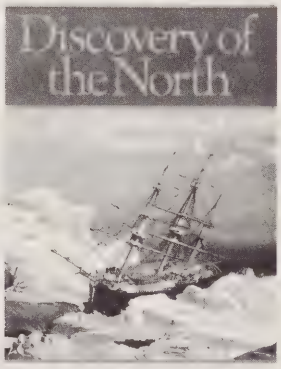
4. "But look! What was that? One of the snakes had seized hold of its own tail and the form whirled mockingly before my eyes . . ." These are the words of the scientist August Kekule, written in 1865. He had just made a great discovery. But in what field of science was it made?

5. What causes ringing in the ears?

JAY INGRAM

To find the answers turn to page 68





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▶ Two very fine pieces of early 17th-century Chinese furniture were donated by Mr Bernard Ostry to the ROM Far Eastern Department, late last year. One piece is a rectangular table, which probably would have stood in one of the formal rooms of a Chinese house. The other is a low rectangular table, which was specially designed for being placed in the middle of a *Kang* (couch) and could be used for writing, playing games, or holding refreshments. Both pieces of furniture are a deep honey-gold colour and are made out of *Huanghuali*, a dense fine-grained hardwood that is one of the most highly prized woods in China for furniture making. These two tables, with their simple elegant lines, are outstanding examples of the Chinese cabinet makers' appreciation of fine wood, and their skill at cutting and polishing to enhance the wood's natural beauty.

SARA IRWIN

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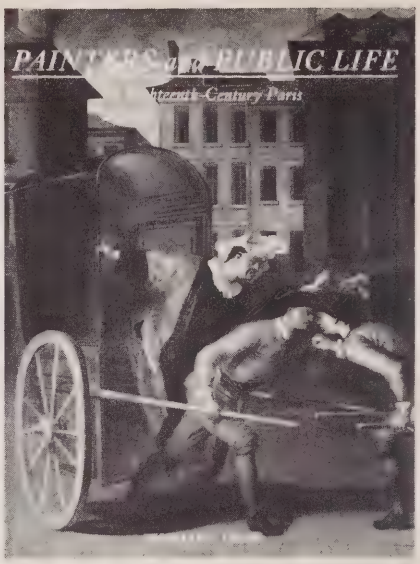

Painters and Public Life in Eighteenth Century Paris

Thomas E. Crow
Yale University Press
285 pp. $40.00 (cloth)

Reviewed by Dr Jill Finsten, lecturer in the cultural studies programme, Trent University

Unlike most Marxist historians, Thomas Crow of Princeton University is a witty and lively writer, with a sly sense of humour and an ability to write with sensitivity about paintings. In this book Crow attempts to explain the historical, social, cultural, and economic forces that determined the course of French art in the decades leading to the Revolution. In a book that is scholarly yet entertaining, a cast of seemingly thousands and an abundance of details are brought together to tell a story with all the fascination and inexorability of high drama.

Crow's central thesis is that "The Public" played an increasingly clamorous and influential role in the development of French 18th-century art. I am not completely convinced by this thesis although there is no question that the whole period set in motion forces whose repercussions are still central to our own society and culture. Thomas Crow describes the birth of the relationship between artists and the modern art

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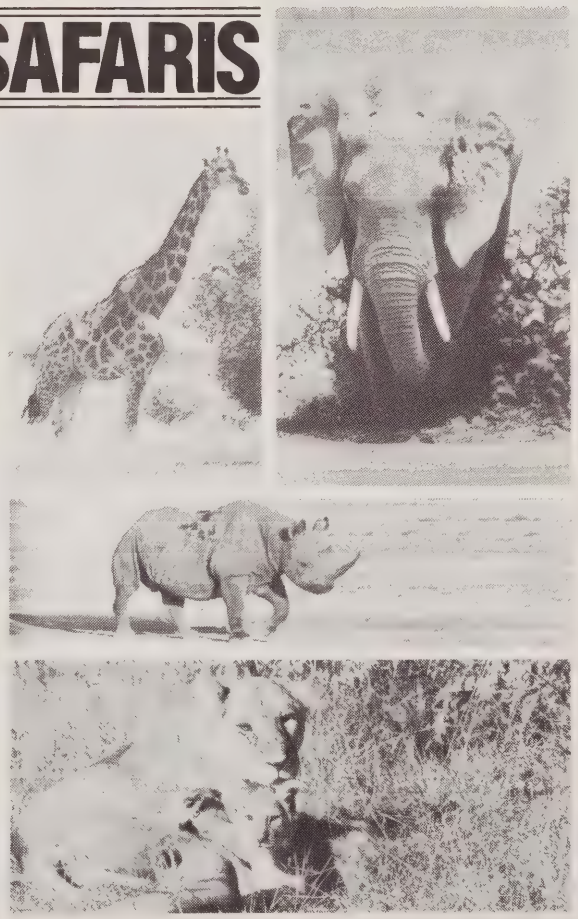

public as he traces the complex historical threads that were bound together in an explosive and historically inevitable way. His four major protagonists are the government, the public, art critics, and artists.

There are plenty of ironies; one of the most striking concerned the Salon. In 1737 the French government revived the biennial art exhibition or Salon, which was held in the Salon Carré of the Louvre. Until the 1770s, public participation in this major artistic event was encouraged; the government was responsible for transforming the event from the exclusive preserve of a small intellectual/aristocratic elite into a public extravaganza with strong carnival overtones. Mr Crow suggests that this trend towards democratization on the part of the government and its official voice, the Academy, was accompanied by a reform of the art itself. It is his contention that the government's cultural permissiveness motivated the growing hostility towards the very undemocratic attitudes in all other areas of government. One has the distinct sense of a government-created Frankenstein which, fuelled by the radical critics, turned on its creator.

Mr Crow believes that he has located a very elusive creature, "The Public", in the voices of the critics, whom he quotes at length and through whom he charts the shifts in the politico-cultural wind. I'm not at all sure that art critics and connoisseurs, however impassioned, represented the voice of the public any more in the 1770s than they do now: these writers idealized the public "everyman" to the point where the ordinary bourgeois citizen became as much of an abstraction as heroic concepts such as nobility and virtue, which also came to have pointedly political, anti-royalist connotations.

Nevertheless it is fascinating to see a cataclysmic political process being reflected by a cultural process: the establishment of a harmonious rapport between "high art", as exemplified by the historic *grand gout* of Poussin, and "low art", the illusionistic Dutch genre and still life paintings which Jean Q. Publique really preferred. The two principal actors in this critical struggle were Greuze and Jacques-Louis David, and the chapters on these artists are compelling.

Crow also examines the whole issue of government sponsorship and funding of a nation's artistic life, which raises questions that have a special relevance to Canadians. To what extent is government patronage, or intervention, desirable in the artistic life of a nation? Does the government expect something in return, if only the continuance of the status quo? Does democratization mean catering to the lowest common denominator? Does the artist have a responsibility to society as a whole? Should we expect artists to be our political and moral vanguard? These are precisely the questions that are being asked about the role of art in our society. And learning about the origins of this aspect of our culture from Mr Crow's provocative book is a rewarding experience.

A Critic at the Salon of 1753, etching by Charles-Nicolas Cochin (?), frontispiece to *Le Salon*, 1753, by Jacques Lacombe

The Oath of the Horatii (study), by Jacques-Louis David, black chalk, ink, and wash heightened with white on paper, collection of Musée Wicar, Lille

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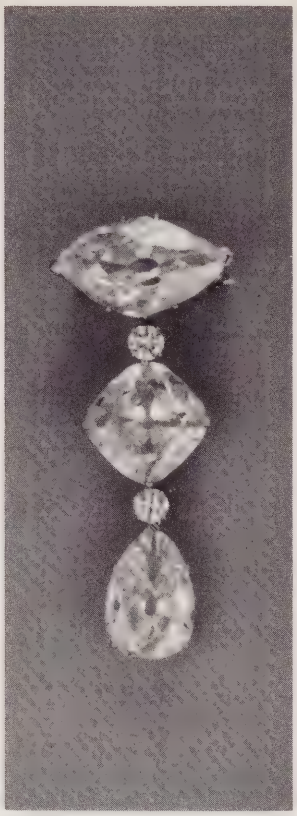

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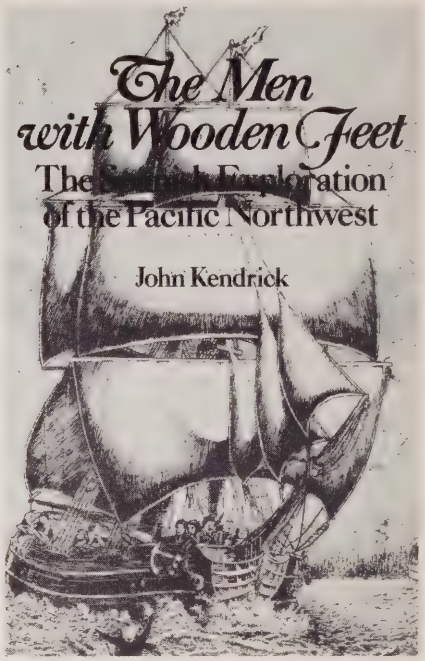

The Men with Wooden Feet
The Spanish Exploration of the Pacific Northwest

John Kendrick
NC Press
192 pp. $16.95 (cloth)

Reviewed by Dr Walter A. Kenyon, former curator of archaeology, ROM

When Balboa crossed the Isthmus of Panama in 1513, he became the first European to see the Pacific Ocean. In a wild burst of enthusiasm, he claimed the entire coastline, washed by that sea, for Spain. He claimed it "for all time past, present, or to come without contradiction . . . from the Pole Arctic to the Pole Antarctic". Spain was occupied with other matters at the time, however, and made no attempt to explore the northern parts of the coastline that was claimed for her with such confidence. In fact, more than two centuries were to pass before Spain turned her attention to the north. Then in 1774, she sent Juan Perez up the coast to reassert the claim.

Perez sailed from San Blas, Mexico, with a crew of eighty-eight men in the *Santiago*. Although he sailed as far north as the Queen Charlotte Islands, he first landed near the inlet that became known later as Nootka Sound. Gazing in astonishment at

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the boots of the Spaniards, the barefoot Indians concluded that the strangers were "men with wooden feet".

It is this observation that John Kendrick has chosen for the title of his thoroughly delightful book on the Spanish exploration of the northwest coast. So far as I know, this is the first comprehensive treatise on the subject. Kendrick combed the archives of both Mexico and Spain to study the pertinent documents, gathering up a vast body of data during the process. He then approached his material as a storyteller, as one who wanted to share an exciting drama with the general public rather than with the professional historian alone. And he is an excellent storyteller. However, the more academically inclined readers are not overlooked for the salient features of the story are solidly documented.

The presence of the Spaniards on the northwest coast did not result from simple curiosity about an unexplored corner of the world. The Spaniards were concerned, rather, with the fear that the Russians in Alaska might be expanding their activities southward. And they hoped, also, to locate and explore the western entrance to the northwest passage, an entrance that Juan de Fuca, a charismatic Greek pilot in the Spanish service, claimed to have found in 1592.

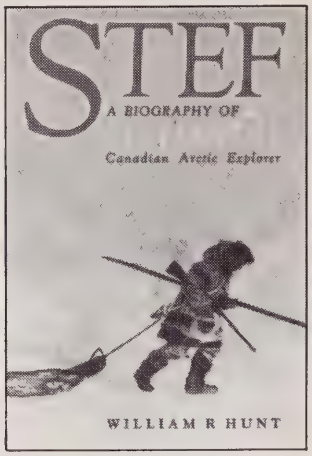
Over the next twenty-one years eleven expeditions sailed north from Mexico to what is now British Columbia. The fourth expedition, led by Martinez and de Haro in 1788, returned with disquieting news: first, the Russians were suddenly claiming the entire Pacific coastline between Alaska and San Francisco Bay; and second, the coast was swarming with British and American fur traders. Following the publication of James Cook's journal in 1784 in which he stated that sea-otter skins from the coast fetched a very high price in China, the traders rushed to the region to exploit this lucrative trade.

In response to this combined threat, the Viceroy of Mexico decided to bolster the Spanish claim by founding a settlement at Nootka. Esteban Martinez was sent north the following year. When he arrived at Nootka Sound on 5 May 1789, he found two trading-vessels riding quietly at anchor, and before the summer was over, three more vessels arrived. Martinez was so busy capturing and looting intruders that he was unable to take formal possession of the country until 24 June. Only then could he find the time to build a small, fortified post.

The northwest passage was never discovered by the Spanish, who with the English determined that it had to be north of Alaska. The Spanish and English did discover, however, that Nootka Sound was on an island, now called Vancouver Island, and not on the mainland.

Ultimately a land claim battle arose between the English and Spanish over the settlement at Nootka. But at that point fate intervened in the guise of the French Revolution. Neither England nor Spain could tolerate the new French government that had been established, for the English and Spanish monarchies were opposed, on principle, to the beheading of kings. In January 1793, England and Spain joined forces to re-establish the *status quo* in France. The affairs at Nootka seemed insignificant when compared to regicide, so both governments agreed to withdraw their claims to the area. On 25 March 1795, the buildings were pulled down, the colours were struck, and the settlement at Nootka was abandoned.

The Spanish presence on the Pacific northwest coast was brief, but dramatic and John Kendrick tells the story with precision and elegance.



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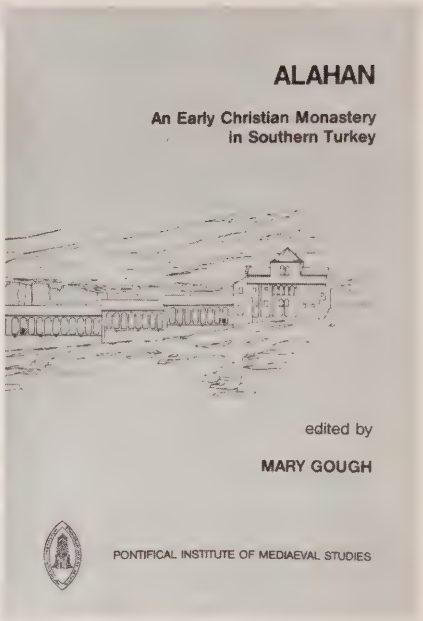

Alahan: An Early Christian Monastery in Southern Turkey

Edited by Mary Gough
Studies and Texts of the Pontifical Institute of Mediaeval Studies, no. 73
235 pp. $22.50 (paper)

Reviewed by Dr A. D. Tushingham, former chief archaeologist, ROM

Many readers who have followed the Museum's field work over the last twenty years through the pages of the *Archaeological Newsletter* will remember the reports by Professor Michael Gough of the Pontifical Institute on the joint PIMS/ROM excavations at Alahan in Turkey. Mary, his wife, had worked closely with him through the years at Ankara and Toronto, and after Michael's sudden death, in 1974, the preparation of the final report became her responsibility.

This she has undertaken, modestly but competently, with the aid of colleagues whose contributions are well documented, precise, and very readable. The book is worthy of its subject: the general and detailed description of the complex of buildings making up the "most striking monastic foundation in Asia Minor", in both its liturgical and domestic aspects. The texts are accompanied by an excellent assortment of plans, sections, scores of figures, and excellent photographs.

The site is indeed magnificent. It is a narrow ledge, partly natural, partly quarried, about two hundred and fifty metres long and thirty metres wide, on the side of a mountain, some three hundred metres above the road, and facing south across a panorama of mountains and valleys. The site was well provided with water, protected by its position from the cold north winds, and defensible against hostile intruders. Above all, it afforded the isolation and tranquillity demanded by a monastic community.

The first occupants of Alahan lived in the natural complex of caves at the western end of the ledge, but gradually they altered the caves to create more regular forms; they even carved out two churches. Other rock-cut cells can be seen in the cliff face forming the boundary of the more elegant architectural remains, which include the three-aisled basilica, a hospice (?), the baptistery, a necropolis, a shrine, and the east church. These structures were linked by a handsome, but unfinished colonnaded walk.

All evidence points to the buildings as dating from the latter part of the reign of the Emperor Leo (457–474 A.D.) and, particularly, that of Zeno (474–491 A.D.), who was a native of this region and was probably the patron of the establishment. Its early date combined with its splendid and significant architectural and decorative features make Alahan a truly "Christian Delphi" and a key site for any student or admirer of Byzantine architecture. Its abandonment, which was followed by a re-occupation and crude partial rebuilding in the 6th (?) century, became complete no later than the early 7th century as a result, no doubt, of disturbed political and social conditions.

With this publication Mrs Gough and her co-workers, particularly the architect Gerard Bakker, have provided the archaeologist and the art historian who are interested in early Christian culture in the whole of the Levant and Turkey an excellent study and appreciation of the monumental establishment, Alahan.

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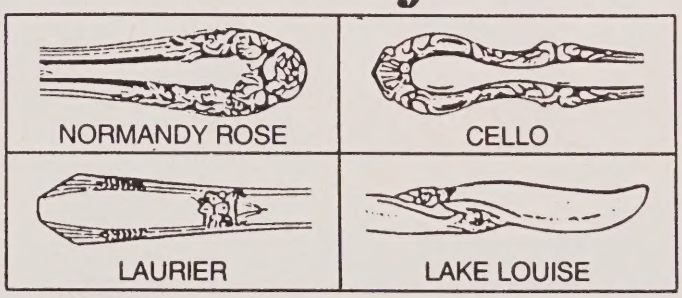

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Answers to *Rotunda Quiz*

1. Rings are the easiest objects to grab. Sergei Ignatov of the Moscow circus juggled eleven rings, the greatest number to be juggled by one person at one time. Records for other objects include ten balls, eight sticks, and eight plates. It has been suggested that twelve of the same object will be the most that one person will ever juggle at one time.

2. Possibly yes to both. The earth might have had a ring about thirty-four million years ago. There are tiny glassy fragments of that age, called tektites, which are strewn across the surface of the earth. They might have come from some gigantic lunar explosion; American astronomer John O'Keefe suggests that many of these tektites would have missed the earth and formed a ring around it instead. A possible future ring has a moon connection as well. Over billions of years, the moon should move first farther away, and then back perilously close to the earth, so close that the earth's tidal forces will tear the moon apart, leaving its shattered remnants to form a ring.

3. Until the 19th century, fairy rings were thought to be the circular paths made by dancing fairies, or the well-worn tracks of moles, or the traces left by whirlwinds, or lightning. Charles Darwin's grandfather Erasmus wrote in 1790: "So from dark clouds the playful lightning springs,/Rives the firm Oak, or prints the Fairy rings." If you entered a fairy ring in England you might have come under the spell of the fairy folk. In France, entering a fairy ring meant that one risked encountering giant toads with bulging eyes.

The modern explanation, while not so rich in wonder, nonetheless has an appealing simplicity. The ring begins as a single mushroom spore that falls to the forest floor and then germinates. The spore produces a dense mat of underground threads of tissue that spreads out equally in all directions. The mushrooms all erupt at the outer edge of this circle thus creating the ring. It is really astonishing to discover, if one considers the rate of spread (a range of thirteen to thirty-three centimetres per year), that some of the biggest fairy rings must be ancient; one ring found in Colorado was estimated to be about six hundred and fifty years old!

4. If you said biology or animal behaviour, you are wrong. The hoop snake, a creature that grabs its tail in its mouth and rolls downhill to escape its enemies, is charming but fictitious. Kekule was dozing in front of the fire thinking, or dreaming, about the benzene molecule, and how the carbon atoms in the molecule could be arranged. The snake inspired Kekule to imagine benzene as a ring: this is one of the key discoveries in organic chemistry.

5. Ringing in the ears, or tinnitus, has no single cause. It can be the result of heart disease, head injury, exposure to prolonged noise, even excess consumption of alcohol or caffeine. Sometimes the noise can be caused by muscle movements or a pulsation in an abnormal blood vessel. But often the source can't be identified and then it is presumed to be a problem in the inner ear, or even in the auditory nerve. In fact in some cases where the auditory nerve has been severed, the ringing continues, which suggests that it is actually in the brain.

It's the variations on this simple ringing theme that are the most fascinating. Researchers in Holland found a young woman whose right ear produced tones so loud that they disturbed her sister when they were playing the piano together. The woman with the sonorous ear was unaware of these tones. And finally there was a dog in Minnesota that produced a fifty-nine decibel tone from one ear, about the loudness of normal human speech.

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